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[Special Editorial Correspondence.]

THIRTY-EIGHTH ANNUAL MEETING, NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

YOUNG'S HOTEL, BOSTON, MASS., Feb. 19, 1908.

Dear JOURNAL: Those who, on retiring last night, were felicitating themselves on the prospect of bright skies and bracing temperature for to-day, reckoned well without their hopes. The morning commenced dull and threatening, and ere the convention was called to order snow was falling thick, and as the hours advanced the fall grew thicker. At adjourning time for the first day's sessions rain had the upper hand, with the well known accompaniment of slush. 'Tis a poor storm that has no compensation, and maybe if the weather had been better the attendance at the sessions might have been slimmer. But, whether so or not, the assembly hall in this famous of New England's hostelries was well occupied when business was on. The proceedings were called to order shortly after 10 o'clock by President William McGregor, whose rapid work from the directing desk, in which speed he was notably well paced by Secretary N. W. Gifford, soon had the programme order cleared to the Report of the Board of Directors and the election of new members. The former contained nothing of especial importance, but the rolls were lengthened by the addition of many names, which lengthening surely shows that the Mother Association certainly holds out attractions for the young men to join her forces. That the Association suffers not from the inattention of its members was well shown by the goodly number which confronted President McGregor, when that energetic gentleman commenced to read his annual message. The document was not a lengthy one—quite to the contrary, it was brisk, but nevertheless terse. In it he submitted the thought that the Association came near to having no message from him, in that never before in his experience had the business situation and the state of the public mind been better adapted for a policy of doing much and saying little. This, of course, had reference to the depression and unrest which ruled the country since early last fall, and in this knowledge he reimpressed upon his hearers that their duty was to resist depression with the vigor of renewed exertion, but congratulating them upon the courage which the industry showed in standing to the rack in respect of worthy effort. The address was well received, even though its text occasionally showed that its composer was in no completely harmonious balance of mind, as particularly instanced by this sentence: "Moreover, you have on file or in hand a large number of 'undigested' presidential messages or addresses—and messages are not as popular as they were some time since." The address having been referred to committee for consideration and report, and the reports of Secretary and Treasurer Gifford having been disposed of, the correspondence regrets having been acknowledged and the committee work findings properly digested, the Association, under the heading of "General Business," took up a communication from those who have been urging upon Congress speedy action in respect of forest reservation ere the time for such action for good would be passed, and gave the same hearty indorsement.

The first paper to be considered was that by Mr. W. H. Gardiner, of New York city, whose subject was "The Readiness to Serve Costs of Gas Supply." Argumentative and plentifully backed with the force of figures, Mr. Gardiner's presentation showed that he had given to his subject much study and care, but the discussion which followed—and it was participated in by some of the best analytical thinkers of the Association—seemed to me to indicate that the New England gas men were not ready for the practice of the readiness to serve cost plan. The paper by Mr. H.C. Crafts, of Pittsfield, Mass.—on "Filling Balloons with Coal Gas," detailed the experience in such matter (and a fairly large experience it has been) that they had gained in Pittsfield. To my mind, however, having listened to the paper and the discussion thereon, it would seem that the New Englanders are not particularly enthusiastic over the filling of balloons as a permanent sort of trading, on a scale either large or small. The morning's business was virtually concluded by a dip into the Question Box, and one of the queries—that entitled "How can breeze and other low grade fuels best be burned?"—brought out a really brisk, useful discussion. Still we have been told that this is one of the pre-historic queries.

The gloom of the exterior only added to the brilliance of the interior of Young's this afternoon. The proceedings were commenced with a dip into the Question Box, the debate being started by a discussion of the query as to the net result of the increasing use of pilot lights on arc gas lamps and the like. The general trend of the narrated experience was that even, if all the gas so used was not registered in the meter dials, gas companies could well afford to blink the fact, considering the effect of such aides as factors going to make convenience for users and so on. A table submitted by Mr. Africa in this connection was noteworthy. The paper by Mr. Carroll Miller, of Pittsburgh, on the "Disposal of Coal Tar" was now taken up. Its paragraphs were pungent enough to stir up a debate that was interesting and instructive. The author, whose Japanese gas works experience enabled him to say among other things that unskilled labor in and around the Tokyo works cost not to exceed 20 cents per day, was also quite up to parrying some pretty clever thrusts by Captain McKay. The discussion was closed through a very well presented statement by Mr. F. G. P. Barnes, of the New Haven Gas Light Company, of some very successful work done in the tar binding of macadam roads by the New Haven Company in suburban places—notably in the district of Orange.

The actual business of the day was concluded by another resort to the Question Box. This time a most interesting debate was brought out over the inquiry, "What has experience to date shown to be the comparative merits of inclines, machine-operated, double-ended and vertical retort systems?" Several took part in it, but the pronounced contribution to it was made by Mr. Frederick Egner, who read a lengthy and interest compelling statement favoring the verticals. In it he quoted from results obtained under the Woodall-Duckham sys-

LIBRARY OF CONGRESS. FEB 24 1908 SMITHSONIAN DEPOSIT.

tem in England, and from the large continental example in Dessau. The veteran's color came right to view when the hearty round of applause that greeted the finish of his findings echoed through the hall. So for the recess, which is the prelude to the banquet, that is to be set as usual in Young's.

It may not be amiss to here note the beautiful mention of the Association's dead made in President McGregor's address. And this is especially true of his reference to our late Charles E. Sanderson, the news of whose summons from earth came to the Association last year just at the close of the first day's session.—C.

Wednesday 11 P.M.

The banquetters have just vacated the banquet hall, and if it were woe without from the storm it certainly was well within Young's and its beautiful showing of fraternality. That the feast was served in proper order and in excellent quality is surely the truth, and that the proceedings were of the New England order may be stoutly affirmed by the 150 or more who shared in the dinner. President McGregor was toastmaster, in which gentle art he is decidedly a past master. May his shadow never grow less. It would be without the limits of this letter to write at length concerning the speeches, but I must say that Massachusetts has every good reason to be proud of the oratorical skill and eloquence of the Speaker of her House of Representatives—the Honorable John N. Cole.—C.

YOUNG'S HOTEL, BOSTON, Feb. 20, 1908.

Dear JOURNAL: Bright sunshine followed the odd storm of yesterday, but slippery, slushy going was the fate of those who had to make headquarters from their abiding places in other hostelries than Youngs. However, that unpleasant experience did not keep the attendance down, for the opening of the concluding session was marked by a goodly number. Business was commenced by the election of officers for the year, and these were named:

President—W. G. Africa.
First Vice-President—Benjamin J. Allen.
Second Vice-President—W. H. Snow.
Directors—D. D. Barnum, T. H. Hintze, C. A. Learned, J. A. Coffin and H. K. Morrison.
Secretary and Treasurer—N. W. Gifford.

This result was somewhat in the nature of a surprise, for in the regular order of things Mr. J. E. Nute should have gone on to the First Vice-President's position. His declination to serve, however, was positive, much to the regret of all. The Association here took notable action in respect of the resignation of Mr. Malcolm S. Greenough from active membership, but not to dwell over the matter, the body finally determined to authorize its executives to ask Mr. Greenough to withdraw the resignation; and if that gentleman, who was with the Association from almost the beginning, who was honored by it with every promotion that it could give to him (honors certainly nobly won and worthily worn) could have heard the reasons advanced for this unwonted action of the Association he could not doubt the sincerity of its purpose to hold him to the end. The report of the Committee on Uniform Accounting and Depreciation was then read by Mr. W. H. Gardiner. That his presentation was forceful and useful was shown in the action taken thereon. The Committee was ordered to continue the work so well begun, and was further instructed to act in conjunction with the kindred existing Committee of the American Gas Institute. The paper by Mr. Charles F. Leonard, of Fall River, Mass., on "A Reinforced Concrete Oil Tank Building: Design, Construction and Cost," next occupied the attention of the members. It was certainly a complete communication, and it was handsomely supplemented by a series of notes put together by Captain McKay, who, in his usual excellent style, described the construction of two large reinforced concrete pits now in service at the Everett (Mass.) plant. These communications were accompanied by a series of excellent photographs of the work during its varying stages. The brisk discussion that ensued was followed by the paragraphs on "Maintaining Mantle Lights," prepared by Secretary Gifford. That gentleman never writes lengthily, but it is beyond question that that which he does write down always brings out a good discussion. This time simply offered further proof of such fact.

The Question Box was here successfully and usefully emptied of its final queries. A sort of mild surprise now came to the members in the shape of a lengthy communication on the values and virtues of balanced-draft practice under boilers and possibly in retort furnaces, submitted by Mr. T. L. McClain. He certainly was not sparing in his description of the system favored by him. This brought the 38th meeting to a close. Quite like those which preceded, its records are of the useful sort, in that these are the history of work carefully planned and successfully completed.—C.

THOMAS FITCH ROWLAND.—IN MEMORIAM.—SOCIETY OF GAS LIGHTING.

At the last regular meeting of the Society, January 9th, 1908, the President appointed a Committee of three to draft a suitable minute on the death of one of our Honorary Members, Mr. Thomas Fitch Rowland. That Committee now submit the following:

On the occasion of the annual meeting of the Society, December 12th, 1907, our Secretary, in his annual report, alluded to the fact that, during the year just then closing, no deaths had occurred among our members. On the 13th of December (but 1 day afterward) one of our Honorary Members, Mr. Thomas Fitch Rowland, passed away. Mr. Rowland became a member of the Society on November 21st, 1889, and while, owing to long continued ill health, he was unable to take an active part in, or attend our meetings, he continued his membership and never lost interest in the affairs of the Society or the welfare of its members.

Mr. Rowland was born in New Haven, Conn., March 15th, 1831, and was a lineal descendent of the Hon. Thomas Fitch, the last Colonial Governor of Connecticut. He attended public school until 13 years of age, when he commenced his life's work in his father's grist mill, which was located on the bank of the old Farmington canal, in New Haven. At that time he made his first effort at boat building, which resulted in the production of a small skiff with which he amused himself in leisure moments on the waters of the canal.

Some few years after, when the railroad between New York and New Haven was constructed, the bed of the canal was utilized for the roadbed, and the grist mill and all other buildings removed to clear the site for the railroad station. He then entered the employ of the railroad as an apprentice, and while there acted as fireman of the locomotive of the third passenger train over the new road.

In 1850 he left the railroad and became Assistant Engineer on one of the Long Island Sound steamers, plying between New York and Hartford, Conn. Soon afterwards the line was sold out. He then obtained a position as draughtsman with the Allaire Works, and in that capacity designed and supervised the building of the engines, etc., of the Revenue Cutter Harriet Lane, built for the U. S. Government, and other work of like character, resigning from there to accept a position with the Morgan Iron Works, where, as Chief Draughtsman and Engineer, he designed and supervised the construction and installation of all the machinery for a number of steam vessels of various types. One of these vessels (an iron steamer) was constructed in Greenpoint, Brooklyn, N. Y., where the Continental Iron Works is now situated, and upon its completion he formed a partnership with the then proprietor of the yard.

One of the first contracts, if not the first taken by the new concern, was to construct and lay the large Croton water mains across the High Bridge over the Harlem river. This main supplied all the water used on Manhattan Island for many years. The concern also constructed and equipped a large number of wooden steamers used in the Long Island Sound traffic and elsewhere, followed later by more iron construction. In 1860 the partnership terminated, Mr. Rowland carrying on the business as the Continental Works, where he built the original Monitor, and the memory of the naval battle in Hampton Roads when she saved the day for the Union is still fresh in the minds of many of us. Subsequently eight iron clad vessels of different types were constructed at the Continental Works by Mr. Rowland for service during the civil war. At the close of the war he turned his attention, among other things, to the designing and construction of gas plants and apparatus, in which line he succeeded in building up a large business, and designed many complete plants as well as additions and alterations to existing plants. The first successful water gas plant in the world was designed and erected by Mr. Rowland in this city.

In the year 1887 the Continental Works became an incorporated Company, under the name of the Continental Iron Works, Mr. Rowland being the first President, remaining in that position up to the time of his death. Within the limits of this necessarily brief sketch of his career it is impossible to give only the merest outline of his various achievements.

Mr. Rowland was essentially a busy man. He loved his work and met with the success which always comes to those who work, and work intelligently. Quiet in his tastes and thoroughly domestic in his habits, he found but little time for so-called social or society functions, taking his pleasure and enjoyment with his family and a few immediate friends. Charitable to a fault, while he had but little sympathy with drones, he could, and did, always find time to help those who manifested a disposition to help themselves. A consistent and practical Christian, he always applied the precepts of the Golden Rule in business as well as in private life. His loss will be distinctly felt by the several engineering societies with which he was identified, being always ready with advice and substantial financial aid to further any proposition in the line of advancing the science and practice of engineering. A typical, self-made man, he gained a position in the front rank in his profession by reason of his exceptional ability, his perseverance and force of character, all combined with the strictest integrity and honesty. Of late years long continued ill health impaired his physical powers, but his mentality still remained vigorous and active, and now his long, eventful and useful life is ended.

Thomas Fitch Rowland has passed from among us in the fullness of years, leaving behind him an unsullied reputation, and a proud record of deeds done and work accomplished. Those who deeply regret his loss are many in number, and he will ever, while memory lasts, be thought of as one who did not live in vain.

The funeral services, at the Church of the Heavenly Rest in this city, were attended by a large number of his associates and friends, among whom were many members of our Society. He is now at rest, in the Evergreen Cemetery, in his native city, New Haven, Conn.

W. H. BRADLEY,
D. D. FLEMMING,
F. C. SHERMAN,
} Committee

[Concluded from page 277.]

PROCEEDINGS AMERICAN GAS INSTITUTE, SECOND ANNUAL MEETING, HELD AT THE NEW WILLARD HOTEL, WASHINGTON, D. C., OCTOBER 16, 17 AND 18, 1907.

THIRD DAY—MORNING SESSION.

Discussing Report of Committee on Meters.

The President—The next business in order is the consideration of the

REPORT OF THE COMMITTEE ON METERS.

This report was made last year and comes up for consideration now.

Mr. Walton Forstall—Mr. President, if discussion is in order on that report, I would like to read the discussion of this report written by Mr. William J. Serrill, of the Philadelphia Gas Works.

The President—Is there any further discussion of the report of the Committee on Meters?

[For Mr. Serrill's communication, see JOURNAL, Nov. 18, 1907.]

The President—Is there to be any further discussion on the report?

Mr. John Gribbel—In view of the fact that there has been so much preliminary work already done in testing larger capacity meters, and inasmuch as no definite results in the way of formulating a standard have yet been attained, it seems wise for this Institute not to commit itself to any standard until further light has been gotten on the subject. I move, therefore, that the report of this Committee be received and laid upon the table for future action, and that the committee be discharged with thanks.

A Member—I second the motion of Mr. Gribbel. While undoubtedly, good has beem accomplished, the results so far have been very much under my idea of what should be, and what, as has seemed to me, were the ideas of others, I think that the recommendation named by the Committee in the statement just read is not exactly correct, therefore, I am very strongly in favor of letting this matter rest over for a time.

Mr. Adams—I move to amend that motion by instead of moving to put it on the table, have it referred, as has been our custom, in such cases, to the technical Committee.

Mr. Gribbel—I think that is a better proposition. I accept that amendment.

The President—That the whole matter be referred to the Technical Committee as provided by the Constitution, and that the present committee be discharged with the thanks of the Institute. That is the motion which is now before the house as I understand. Those in favor will please say "Aye." Contrary minds, "No," [Carried.] The next business in order is the Report of the Nominating Committee on the Secretary-Treasurer. Is that Committee ready to make any further report?

NOMINATING COMMITTEE AND THE OFFICE OF SECRETARY-TREASURER.

Mr. Lathrop—Mr. Chairman, the Nominating Committee meeting decided to accept the recommendation of the special committee which was appointed to select a Secretary. I understand that that committee has no report to make, but that the Directors, at a meeting yesterday, made a recommendation which I have no doubt will be acceptable, although I have been unable to see the other members of the Nominating Committee to consult with them about it. I assume, however, that in voting to accept that report of the special committee they will accept the recommendation of the Board of Directors. I understand from Mr. Dunbar that the Directors recommended that no person be nominated to serve as the active Secretary-Treasurer.

The President—I suppose we may accept as the report of the Nominating Committee the recommendation of the Directors for the ensuing year.

Mr. Lathrop—I cannot say as to that, Mr. President, except for myself, but I do not think that the members of the Committee would have any objection to that recommendation of the Directors.

The President—I would like to have this very regular.

Mr. Lathrop—I have tried to find out, but have been unable to see the other members of the committee.

The President—The Constitution provides the way for a nomination to come before this body. I think we should make every effort to keep within the Constitution. I would like to ask if Mr. Lathrop and the members of the Nominating Committee agreed not to make a nomination for Secretary-Treasurer until they had the recommendation of the Board?

Mr. Lathrop—Yes, sir.

The President—Following that suggestion then, I will read the action as taken by the Board, then perhaps the Chairman of the Nominating Committee will be willing to make no further report for the Nominating Committee.

The President read as follows: "A special meeting of the Board of Directors was held at the New Willard Hotel, after the adjournment of the Institute, Thursday afternoon, President Clark presiding.

On motion of Mr. Lynn, duly seconded and passed, it was voted that the Board of Directors recommend to the Nominating Committee that they select as a Secretary some person who is a member of the Institute, who will regard the position as honorary, and serve without compensation for the ensuing year, and that the incoming President be empowered to engage an assistant or clerk to the Secretary and Treasurer, to look after the headquarters in New York, at a salary of not exceeding $3,000 per annum, and expenses. That is the action as passed by the Board.

Mr. Lathrop—I had not seen that, and did not know what the terms of the vote were. I speak only for myself individually, not as a member of the Committee, but for myself, I should be very glad to accept that.

The President—Under that vote, the Nominating Committee should agree upon some person to act as Honorary Secretary. Would you kindly make an effort to see the others so that we may get this disposed of this morning? We can cover this by a nomination by petition, I presume.

Mr. Lathrop—That will be acceptable to the Committee, I think.

The President—While this matter of the report is in hand I will read the balance of it. The Board further reports that,

"On motion, duly seconded and passed, the Board voted to pay Mr. T. C. Jones for his services as Treasurer during the past year the sum of $600, and his expenses."

Mr. Wm. McDonald—I move that that action be approved. [Seconded.]

The President—Gentlemen, you have heard the motion. Any remarks? Those in favor please say "Aye." Contrary minds "No." [Carried.] The next business in order is the

REPORT OF PROGRESS ON "A" METERS.

Mr. Forstall, will you please read that.

Mr. W. Forstall—This is a report made by Mr. W. J. Serrill, of the Philadelphia gas works, in fulfillment of a promise, made at Washington three years ago, that the Philadelphia gas works would keep the gas fraternity in touch with the results obtained from the use of "A" meters. I do not believe it is necessary to read the report. It will, however, repay careful study. It may be summarized by saying that "A" meters have proven very satisfactory, but that certain weaknesses of design have developed which are now being corrected.

[For the Serrill "Report of Progress on 'A' Meters," see JOURNAL, Nov. 18, 1907.]

The President—Next in order is the report on

EXPERIENCE WITH DIPPING DIAPHRAGMS IN PHILADELPHIA,

by Mr. W. A. Castor. [For the text of the Report, see JOURNAL, November 18, 1907.]

The President—Another paper on this subject is by Mr. George Beadenkopf, of Baltimore. Will Mr. Miller read that paper, which has for its title,

REPORT OF PROGRESS ON "A" METERS.

Mr. A. S. Miller—Mr. Beadenkopf is detained by illness in his family. This report is merely one of progress, and the author did not feel that he had anything new to add, although he did feel confident something would be said in the way of discussion which would contribute to our knowledge on this subject.

[For the Beadenkopf paper, see JOURNAL, November 18, 1907.]

Mr. A. S. Miller—I would say further, there is one point that Mr. Beadenkopf did not mention. He found it necessary to put some form of seal on the rivet heads, as in some instances the rivets had been taken out and the diaphragms punctured.

Discussion.

The President—Gentlemen, those important papers are before you for discussion.

Mr. J. D. McIlhenny—I think these papers will merit consideration by gas men. I believe that the conclusions are correct, and I am going to adopt the same plans in one of the plants with which I am

connected. I am very much pleased that so much work has been done in endeavoring to preserve gas meters, and as I look upon it I am confident more attention will be paid to meters in the future than was given in the past. Many repairs which have been given to meters might have been avoided, or done with much less expense to gas men, if our knowledge of the subject had been as great as it now is. It is a matter of considerable importance to gas men to realize that meters should be handled carefully and thoughtfully, and the sooner that time comes the better it will be for correct registration and for a reduction in expense. I think those who have been engaged in the formulation of the plans detailed in these papers are entitled to very great credit.

Mr. W. H. Gartley—I think possibly, Mr. Chairman, it might be well to re-state some of the history which led up to the idea of dipping meters. Years ago there was a belief in Philadelphia that the gas as manufactured was having a disastrous effect upon the meters, and the thought led to an investigation to determine what was happening. A clue being found we took the oiled leather of a diaphragm and suspended it in an ordinary glass Woulfe's bottle, and then passed gas through the bottle, first chilling it; that is to say, the gas was cooled when it entered the bottle to a temperature lower than it had been at any previus time, and, in consequence, there was a corresponding deposit of vapor. We found that all the condensed vapors had an effect upon the oil that was used upon the leather, dissolving it, result being that in a very short time the leather was entirely bleached. The gas was then warmed to a higher temperature; that is to say, the gas was first chilled, and then warmed as it went into this bottle, with the result that the vapors on the leather were reabsorbed by the gas, the leather becoming entirely dry. In fact it looked as it did before when in the original skin. Then the argument was that that action was going on in a large field among consumers' meters. During the fall, at which time the temperature of the ground remained high, the cellars of the houses where the meters were located were cool, and there was consequently a reduction of temperature in the gas when it passed from the warm ground into the meters in the cooler cellars, and true enough there was the expected action on the meter diaphragm leather. There was a deposition of vapor and a dissolving of the neatsfoot oil. As the winter came on and the cellars were heated, the gas being cooled in the ground, an opposite effect was going on, and the meters were dried out. Now the question of how to remedy that took about 3 years to determine. A great many things were tried by the Research Committee of the United Gas Improvement Company, which I suppose you will never hear of, but it was finally decided that if the inaccuracy of the meter was increased by the drying of the diaphragm, the cure lay in the introduction of a little non-evaporating oil in the bottom of the meter case, as this oil would, when the diaphragm started to dry out, be lifted by capillarity into the leather, thereby recoiling it.

The President—We will now proceed to the next paper, by Mr. Charles D. Robison, on

A NEW CARBONIC ACID GAS INDICATOR.

[For the text of the Robison paper, see JOURNAL, Nov. 18, 1907.]

Discussion.

The President—Gentlemen, the paper is now before you for discussion.

Mr. A. E. Forstall—It does not seem that Mr. Robison makes it quite clear as to whether the ¼-inch iron pipe mentioned in connection with the inlet of the carburetter is allowed to remain open all the time, so that gas is passing through it both during the blow and during the run. I would like also to ask if he has applied the indicator to the determination of the amount of carbonic acid in the flue gases from coal gas benches.

Mr. C. C. Tutwiler—While I do not quite understand, from Mr. Robison's description of the indicator, what may be the functions of several of the solutions employed, the principle underlying its operation is perfectly clear, and I see no reason why it should not be a very valuable instrument when placed in capable hands. The fault with most of the CO_2 indicators which come under my observation is their extreme liability to get out of order and thus furnish unreliable information. They require more or less constant attention by one who possesses not only facility for handling delicate apparatus, but also the ability and means to frequently check them up against the ordinary absorption method. Instruments working on the "balance" principle, such as the "Arndt," while reliable when in good working order, are very susceptible to disturbing influences such as dust, etc. The "Simmance-Abady Recorder" and the "Ados" machine work on an entirely different principle, and while they are not so likely to get out of order, their first cost is high and the apparatus is complicated. What is needed is an apparatus as simple and reliable as a recording pressure gauge; one which will not be affected by rapid changes of temperature and which will stand a certain amount of rough handling. Mr. Robison has tried Prof. Jones' instrument in actual working practice, and his experience seems to indicate that a cheap and reliable instrument has been found. Strache and Jahoda, of Vienna, have devised an apparatus working on the same principle which appears to be even simpler than Prof. Jones' apparatus. A description of this will be found in the "Chemiker Zeitung," Vol. 30, pp. 1128 to 1130. I have no doubt that a final solution of the problem will be found in the adoption of this principle, the unequal tensions being registered on a Bristol or other recording gauge, thus getting a continuous record. I thoroughly agree with Mr. Robison as to the value of such an instrument, and it should go a long way towards insuring uniformity of results in water gas making, and by its aid carbonic acid could be kept down to a minimum. It should also prove very useful in increasing boiler efficiency and in other situations where it is desirable to know the amount of CO_2 being made at any time.

The President—Is there to be any further discussion of this subject?

Mr. G. W. McKee—I would like to ask whether anyone knows of an attempt to make this indicator work in connection with a chart of any kind?

The President—Perhaps Mr. Robison can answer that as well as the other question?

Mr. C. D. Robison—In answer to the question about allowing the pipe to be open at all times, I would say "yes." I see no objection to that. While I have not had opportunity to use the indicator on a coal gas setting, I have used it on water gas pipe, and find it very serviceable there. I see no reason why it should not be used on a coal gas bench.

A Member—Mr. President, I think at Atlantic City (1896) Mr. Holbrook read a paper on a CO_2 indicator that I believe had a chart attached.

Mr. McKee—I think there was an apparatus of that kind which was used on the subway contract in New York. It is put up in a small room, about 6 feet by 4 feet by 8 feet, but it has a lot of very complicated glassware. It is not an apparatus which I think would be applicable for general adoption.

Mr. G. H. Waring—One statement in this paper, to anyone not having experience in the manufacture of gas, is liable to be misleading. I refer to the last statement in the final paragraph, which says that the difference in the cost of oil between the 3 per cent. and 5 per cent. carbonic acid, on an output of 100 million cubic feet would be at least $1,000. The inference would be that by reducing your carbonic acid from 5 per cent. to 3 per cent. you would save 1 per cent. per 1,000 cubic feet. A great many other conditions might arise by trying to reduce your carbonic acid which would be more detrimental than to attempt to counteract the influence of carbonic acid. I wish to go on record as stating that in trying to reduce your carbonic acid too low you are apt to get into other troubles that will be worse than having 5 per cent. thereof.

Mr. R. Norris—Of course, the proportion of carbonic acid in both blue gas and blast gas in water gas manufacture varies very rapidly from moment to moment, and while an apparatus might be all right for indicating the percentage of acid when this percentage is fairly constant, it might not be practicable where, as in water gas manufacture, the variation is rapid. I would like to ask Mr. Robison whether in applying this carbonic acid gas indicator to water gas sets the lag in the indication of the instrument has caused any trouble.

Mr. A. G. Glasgow—I think Mr. Waring and Mr. Norris have indicated the crux of this matter. For simplicity, let us consider blue water gas manufacture. The consummations desired in the blast period and in the gas making period are diametrically different. In the blast period we want the products to escape without any CO present; whereas, in the gas making period, we want the gas to issue without any CO_2 present. But it is impracticable to attain these opposite alternating conditions with the same fuel bed; and it is found in practice that the best final result is attained when a considerable percentage of a reduced CO_2 is left in the crude gas. With gas coke, the most economical proportion of CO_2 in the crude gas is seldom below an average of 4 per cent.; and this percentage usually varies from *nil.* in the beginning of each run, to over 10 per cent. at the end of the run. Likewise, in the first instant of the blast period, *no* CO is

present in the escaping blast products; whereas, by the end of the blast period, the proportion of CO has usually risen to over 15 per cent., and the usual length of the blue water gas blast period for gas coke does not exceed 1 minute. Now, we have no reliable instruments that can concurrently indicate varying cycles like these, and any instantaneous indication which does not reveal the whole working cycle must be used with caution or its influence will be mischievous. On the other hand, an instrument giving a reliable indication of the percentage of CO, present *at the last instant* of each run and blow will be serviceable, provided the influencing practical conditions are sufficiently considered to prevent a wrong diagnosis. Chief among these influences is the condition of the fuel bed. For instance, blast gas analyses may indicate high efficiency of working, when in reality the fuel bed is so bad in parts that free oxygen is passing directly through the fire and producing secondary combustion on top of the fuel bed. Also, the different conditions of the fire before and after clinkering must be kept in mind. In general, it is my experience that one must be exceedingly cautious in regulating operating conditions by instantaneous instead of average analyses.

The President—Mr. Robison, will you close the discussion?

Mr. C. D. Robison—Regarding the sensitiveness with which the indicator works, I would say it seemed to indicate very closely what would be expected in the operation of a water gas set. It lags a little at times behind that which actually takes place, or what you would expect to take place, but we checked up the indications a great many times and found that the average was very close to what we got with the Orsat set, the difference being probably due to the difference in the samples taken, we being unable to get the samples simultaneously. As a general thing, the indications followed exceedingly close to what you would expect.

The President—The last thing on the programme is the

REPORT OF COMMITTEE ON PIPE STANDARDS.

The report, which was read by Mr. Walton Forstall, is as follows:

Purpose of Committee.—Your Committee was appointed to consider the set of 34 plates, representing proposed standards for pipe and specials, which were presented at the 1906 meeting. These plates were practically identical with the standard adopted by the American Gas Light Association in 1905.

History of Work.—Letters inviting criticisms on these plates were sent to many foundries, but comparatively few replies were received. Neither did the members of the Institute avail themselves of the invitation given at the 1906 meeting, viz., that they should write for a set of the plates and forward any criticisms to the Committee.

A Committee meeting was held in New York city, June 24th, there being present Messrs. Strecker, Guldlin and Forstall. It soon became apparent that there was a decided difference of opinion regarding the plates under consideration. The chief objection advanced against them was that they required many separate patterns, whereas a standard could readily be designed along nearly the same lines, but which would allow of many interchangeable patterns. The Committee decided to ask the foundries just how important to them was this question of interchangeability. It also delegated to one of the members the work of preparing amendments to the plates.

Only 4 replies were received to 20 letters sent to various foundries, and, though their tenor favored interchangeable patterns, the few answers could not be regarded as a representative expression of opinion from manufacturers of pipe and specials. For this lack of interest, however, the Committee is not to blame, and it has proceeded to make such changes in the plates as it thought were demanded by the interests of manufacturers and user alike.

A second meeting was held in Ohicago, September 14th, there being present Messrs. Guldlin, Brown and Forstall. A third meeting was held in Washington, October 16th, there being present Messrs. Guldlin, Brown, Miller and Forstall. As a result of the three meetings and of correspondence between the various members of the Committee, a set of 33 plates is herewith submitted.

In making any changes to the standard of the American Gas Light Association, it was recognized that, as such standard, it had been adopted by the largest pipe manufacturer in this country, and that patterns based on these plates were being made from day-to-day by many other foundries. In other words, the Committee realized that no changes should be made except for very good reasons. On the other hand, in the belief that its work might find universal acceptance in due course of time, and, therefore, determine the design of gas pipe and specials in this country for a long time, the Committee felt that there were certain changes that were urgently called for, notwithstanding these changes might involve some hardship in the loss of patterns and open the door to a charge of instability of purpose in the gas associations, on the part of those manufacturers, who, after 1905, adopted the American Gas Light Association standard.

Explanation of Changes.—Having thus explained their attitude, the Committee now desires to describe in more or less detail the changes between the plates as now submitted to the Institute, and as received by the Committee. These represented, as has been said before, the 1905 standard of the American Gas Light Association. For convenience of reference, they will be referred to as the "A" (Association) standard.

In the "A" standard decimals were used thoroughout. So much objection has been made to this feature that all dimensions are now shown as fractions to the nearest 32d, except thickness of straight pipe, where decimals have been retained as necessary to express exactly the thickness corresponding to the weight.

The "A" standard was based on the idea that the same lineal dimensions of bell and spigot pipe were equally useful for street mains as for works' (apparatus) connections. After considerable discussion, the Committee has reached the conclusion that the needs for street work are rather different than for works' connections. Therefore, the term "street" has been applied to those plates designed with reference to street main requirements, while the specials adapted for works use are indicated on separate plates, flanged and bell and spigot specials being shown on the same plate, and being of such dimensions as to be interchangeable. Considering now each plate in turn—numbers are those of present plates:

Plate 1. Standard Bell and Spigot Pipe: No change.

Plate 2. Street Quarter Bends, Class "A": No change.

Plate 3. Street Quarter Bends, Class "C:" No change.

Plate 4. Street Eighth Bends, Class "A:" Extended to 48-inch.

Plate 5. Street Eighth Bends, Class "B:" Dimension "I" increased about 2 inches, to make certain dimensions correspond to similar ones on Plate 3.

Plate 6. Street Eighth Bends, Class "C:" No change.

Plate 7. Street Sixteenth Bends, Class "A:" Extended to 48 inches. Dimension "I" changed a fraction of an inch to make certain dimensions correspond to similar ones on Plate 4.

Plate 8. Street Sixteenth Bends, Class "B:" No change.

Plate 9. Street Sixteenth Bends, Class "C:" No change.

Plate 10. Bushings: No change.

Plate 11. Caps, center lugs omitted: Extension of use of side lugs.

Plates 12 and 13. Street Crosses and Tees: No change.

Plate 14. Line Drips: No change.

Plate 15. Yard and Holder Drips: No change.

Plate 16. Hat Flanges, 20-inch sizes added: Dimension "N" changed to even inches.

Plate 17. Plugs: No change.

Plate 18. Drip Plugs: No change.

Plate 19. Reducers, Class "A": Dimensions "H" and "I" changed where necessary to make slope constant for all sizes of reducers. Dimension "J" changed where necessary to make it constant for the same sizes.

Plate 20. Reducers, Class "B": Dimensions "H," "I," "J" and "K" changed to agree with corresponding dimensions in Plate 19.

Plate 21. Reducers, Class "C": Same changes as to Plate 20.

Plate 22. Concentric Reducers: 16-inch and 20-inch sizes added. Dimensions "H," "I," "J" and "K" changed to agree with corresponding dimensions in Plate 19.

Plate 23. Split Sleeves: No change, except "D" made about $\frac{1}{8}$ inch smaller.

Plate 24. Hub Sleeves: Same change as Plate 23.

Plate 25. Service Sleeves: Same change as Plate 23.

Plate 26. Solid Sleeves: No change.

Plate 27. Y-Branches: Dimension "J" (now "H") changed to agree with corresponding dimension on Plate 5 and (old) Dimension "H" changed to equal "I".

Plate 28. Flanged Straight Pipe: Outside diameter of 8-inch flange changed to 13-inch, and of 12-inch flange to 18-inch to agree with 1898 standard of American Gas Light Association.

Plate 29. Flanged Quarter Bends (with or without base or handhole): Dimension "H" changed to be more consistent as between various sizes, and decreased 2 inches for 36 inches and 1 inch for 42 inches specials. Design of manhole modified and dimension of base decreased.

Plate 30. Flanged Eighth Bends: No change, except "R" extended to show radius of center line.

Plate 31. Flanged Crosses: Changes similar to those made on Plate 29.

Plate 32. Flanged Tees: Changes similar to those made to Plate 29.

Plate 33. Flanged Reducers: Changed to make taper uniform, and "J" and "K" similar to plate 19.

On several of the plates of flanged specials no weights are shown, because there has not been time enough to calculate these weights accurately since the last changes were made. Careful calculation will, however, be made, and the proper weights inserted in the tables before they are printed in the "Proceedings."

Recommendation.—The Committee recommends that these Plates be adopted as the standard of the Institute, and that, either by means of a separate committee or through the agency of any permanent committee that may be appointed to advance technical work, active measures be taken to procure the rapid adoption of this standard, by urging the members to specify it in their orders, and by persuading the manufacturers to change their patterns as fast as possible. In past years standards have been adopted at meetings of gas associations, and then, with few exceptions, the members promptly forgot the standard and specified or took other patterns. This failure to put into practice the designs voted for without dissent, undoubtedly explains the indifference of the manufacturers to any proposed standard. They believe, judging the future by the past, that any standard that we may adopt will not affect their practice to any appreciable extent. Your Committee hopes the Institute will redeem the reputation of the gas profession in this regard, and it earnestly desires a full discussion on the Plates. Every member who votes for the proposed standard, and yet does not intend to use it in his work, because of his preference for what he is now using, owes it to the Institute to explain his position now and fully.

R. D. Brown,
O. N. Guldlin,
Thos. D. Miller,
Walton Forstall,
} Committee and Sub-Committee.

[*Note.*—Owing to the fact that the matter of pipe standards was referred to the Technical Committee for further consideration (see later in the "Proceedings") it was not deemed advisable to publish at this time the 33 Plates referred to in the above report]

Mr. Walton Forstall—I will also read a letter from Mr. Strecker, in which he disagrees with the report just read, and his letter is to be considered as a minority report.

Public Service Corporation of New Jersey,
Gas Department.
Newark, N. J., Oct. 12, 1907.

Mr. Walton Forstall, Chairman, Committee on Pipe Standard, U. G. I. Building, Philadelphia, Pa, :

Dear Sir: Your favor of the 5th inst. has come. I am also in receipt of draft of minutes of meeting of this Committee in Chicago and of proposed report to the American Gas Institute.

I am afraid that I shall not be able to attend the meeting of the Committee called for Tuesday evening next at Washington. I have, however, carefully read the proposed report and have gone over the amended set of plates.

I very much regret that, as the matter now stands, I cannot join in signing the report and in recommending the acceptance of the Plates as the standard of the Gas Institute.

I have always been strongly of the opinion that any standard like the proposed one, worthy of the name, should be based upon certain fundamental principles. Foremost among these, according to my views, is the constancy, for each size of pipe, of the dimension H (as used in the Plates), denoting the distance between center line of special casting and face of flange or back of bell, as the case may be. Having this dimension a fixed one, castings will be interchangeable, pattern work will be reduced to a minimum and the laying out of work will be made easy.

When we met in New York in June last, I found Mr. Guldlin very strongly of the same opinion. I also gathered, from letters read, that Mr. Brown had a decided leaning that way. However, the result of the Chicago conference appears to have been a compromise, which practically sets up two distinct standards within the frame of your proposition, one of so-called street specials, the other for castings to be used at the works. The street specials section of the standard splits again into two, as far as the value H is concerned, one for tees and crosses, another for 90 bends. We have thus for each size of pipe three different values of dimension H, to wit, one for works' specials (both bends, crosses and tees, bell and flange ends), another for street crosses and tees, and a third one for 90 bell bends.

I fail to see why a distinction should be made as between "works" and "street" specials. These castings should be all of the same pattern and could be used and are used indiscriminately in the works or in the street department. Whichever value of dimension H would suit the views of the majority of the members, should have been adopted for all classes of castings.

Taking up the Plates seriatim would make the following remarks:

Plate 1. Bells and spigots. Agreeable to me.

Plates 2 and 3. Ninety degrees bends. Come under general criticism as to value of "H".

Plate 4. Forty-five degrees bends. Would advocate making distance "H" the same for both 45° and 22½° bends (shown on Plate 7).

Plates 5 and 6. These patterns are hardly needed.

Plate 7. Same remarks as to Plate 4.

Plates 8 and 9. Patterns hardly needed.

Plate 10. Bushings. These bushings, as I take it, are to act as short reducers. They are to be inserted like plugs into bells of fittings, and in turn form other bells to receive spigots of pipes of reduced diameter. The plug part of the bushing should be the same as the ordinary plug, but in the proposed pattern it is not. The latter is from 4½ to 5 inches long with taper of ¼ inch, which is barely sufficient. The regular plug pattern is 5½ inches to 6 inches long, with taper of only ½ inch. Then, as to the bell part of the bushing; this should have exactly the same dimensions as a regular bell and this has been followed out, except that it has no shoulder to receive the spigot of the entering pipe, especially if this should have no bead, as in a cut pipe. In the instance, for example, of a 6 by 4 bushing, the back of the bell is reduced to $5\frac{5}{8}$ inches diameter only, which is exactly the size of a 4-inch spigot, including bead. This would thus possibly, and a cut pipe would surely, slip through the opening, which is certainly not what it should be.

Plate 11. Caps. No objections. Rarely used in modern work.

Plates 12 and 13. Crosses and tees. Open to the general objection as to value of "H."

Plate 14. Street drips. It is hard to concieve why the bodies of these drips are made at a slight variance from regular pipe sizes like 12½-inch, $15\frac{3}{4}$-inch, $19\frac{1}{4}$-inch, etc. Why not make them of regular pipe size, 12-inch, 16-inch and 20-inch, etc., provided with a standard bell and closed with a standard plug? The bulk of the patterns have a fairly even depth below the bottom of the run of pipe with the notable exception of the 4-inch drip, which is entirely too shallow, measures only 13 inches below outlets, and holds only about 6 gallons of water.

Plate 15. Yard and holder drips. No objections beyond what is stated as to Plate 14. Local considerations will often call for variations from this standard.

Plate 16. Hat flanges. No objections.

Plate 17. Plugs. I consider this pattern a poor one. There is no call for the curvature in the cover. Cover should join the sides at the upper edge, so that plug is particularly strong at this juncture and not unsupported and weak as in pattern shown. The taper given, only ¼-inch, is so small as not to be of practical value, and the plug cannot be backed out. The lugs shown are of little help in this work. Length and taper of plugs should be like that of bushings.

Plate 18. Drip plugs. Should be of same patterns as regular plugs and not varying from same as to length as shown on Plate. Even the street and the yard drip plugs are made to vary in this respect.

Plates 19 to 22 Reducers. Am glad to note that reducer patterns now show an even rise for all sizes.

Plates 23, 24, 25. Split, hub and tapped sleeves. Would advocate ribs on lower flanges, to hold heads of bolts in position, when bolting up, same as on wrought iron pipe flanges. Object to provision calling for "machining" faces of flanges, since it adds largely to the cost and is unnecessary, since sleeves are usually put on with cement, which material will also make a satisfactory joint between the two halves of sleeves, without their being faced.

Plate 26. Sleeves. No objections.

Plate 27. Y-branches. No objections.

Plates 29 to 32. Flange and bell fittings for use at works. Open to general objection as to the value of dimension "H."

Plate 33. Flange reducers. No objections.

In conclusion would say that, while I appreciate that some patterns have been made based upon the standard adopted 2 years ago, of which the proposed one is largely a reproduction, and that any change from this standard would be somewhat of a hardship on foundries having done so, yet they would not be hit any harder than others that have proceeded along the lines of the '98 or any other standard.

As you have stated, this question should be settled for a long time to come and, therefore, we should settle it in a proper manner and worthy of the talent represented by the Gas Institute. It will appear to any engineer who will carefully study the matter that the proposition before us is not the best that could be gotten up, but rather a compromise of existing patterns, of differences in opinion and of interests.

And while much time has already been spent over this vexed question, I would prefer to have its final disposition laid over for another year to having something adopted which falls short of the work and will thus never become popular and lasting.

Yours truly, A. H. STRECKER.

Mr. E. E. Witherby—I think the Commitlee shows very plainly here that the representatives of the manufacturers took very great interest in this matter. As I remember it a report was adopted by the American Association in 1898, another in 1901, and still another report in 1905. It was adopted and passed, probably unanimously, by the Association, at that time, like a great many other reports. Like many other reports, it was probably read by the Committee, and the members thought if the Committee approved it unanimously it must be a good thing and it was adopted. We know that is the way with a good many reports, and then they are forgotten just that quick. Now the constant change of the standard is something for which the Association has been in a measure responsible, and is opposed to that idea of unity of purpose that we would all like to see. The 1901 standard was in use for quite a long time. It has been considered good and very few have had any trouble with it. It apparently satisfied everybody, and I rather object to this constant bringing of the matter up for every little change here or little change there. No rule that anyone will accept will probably fit all conditions.

Mr. W. Forstall—Before this discussion goes any further, I might say to Mr. Wither by that there was no standard adopted in 1901, but the American Gas Light Association was trying to establish the 1898 standard, and I sent in an extended criticism upon it. Now as to the 1905 standard, personally I would like to see it adopted by the Institute in the form it took after revision. The 1905 standard was designed by a pipe manufacturer along the lines wanted by certain large users of pipe, but unfortunately, in working out the details, there were so many errors made that all the Plates had to be gone over and revised. That work of revision was done by the United Gas Improvement Company, and it was done in time to have the manufacturer get the revised standards into his catalogue. Because the 1905 standard, as adopted by the American Gas Light Association, did not exactly agree with the standard desired, we, who were interested in the task, could not come before the Institute in 1906, and say, "Please take the standard of 1905, the standard of the American Gas Light Association, because it is a good standard;" but we had to say that the Plates we had prepared represented practically the same standard as that adopted in 1905. As stated in our report, the plates that are now up for consideration represent a compromise.

Mr. A. S. Miller—In the first place, I would like to say something about the adoption of the standard in 1905. Unfortunately, I was not at that meeting, as I should have been. In '98, or previous to '98, the question was put to the Research Committee of the Americam Gas Light Association whether or not the standard of the Society of Gas Lighting, which had been in use for a great many years, should be adopted. A great many foundries and companies had patterns based on the standard of the Society of Gas Lighting. After going through the subject very carefully, and after having the Society of Gas Lighting correct some small dimensions which did not change the general dimensions of the castings, the American Gas Light Association adopted that standard. The point was made that the standard was incomplete, and it was referred to a committee, as I understood at the time, to elaborate it. The question was taken up with the largest pipe manufacturers in the country, and after an interview with their representatives, the understanding was reached that, with the exception of certain flange castings which were to be shortened, the general dimensions of the street castings were to remain as the dimensions of the American Gas Light Association standard. The next I heard of it this question came up at the last minute of the meeting of the American Gas Light Association in Milwaukee. The President of the Association said the report of the Committee was all right, and the report was adopted, practically without consideration. Now there have been a great many changes in the dimensions which will practically destroy the value of the patterns made by those parties who have followed the standard of the American Gas Light Association which was adopted after a great deal of thought, and which could be elaborated. What is going to be the effect of this, aside from the effect on the mind of the people whom we ask to make patterns? Take the $\frac{1}{8}$ bends for instance; the 4-inch weighs, under the proposed standard, 58 pounds, and under the '98 standard, 44 pounds; the 6-inch under the '98 standard, weighs 64 pounds; and under the proposed standard, 91 pounds; the 8-inch, under the '98 standard, weighs 100 pounds, and under the proposed standard 130 pounds. Coming to crosses, the 4-inch cross under the proposed standard, 143 pounds, unthe '98 standard, 97 pounds: 6 by 4, proposed standard, 173; actual weight, old standard, 122; 8 by 4 crosses, under the proposed standard, 230; actual weight, old standard, 179; 8 by 6 crosses, proposed standard, 262; actual weight, old standard, 186; 4-inch tee, proposed standard, 108; old standard, 71 pounds; 6 by 4 tee, 143 pounds, old standard, 110 pounds; 8 by 4, new standard, 195; old standard, 159. I would, therefore, suggest that if changes are to be made the work should be done with a view to saving money. The principal dimensions of the old American Gas Light Association standard should be retained as far as possible, and such minor changes should be made as experience has proved to be necessary. I do not know whether any of the members of the Association have had much difficulty with the breaking of hubs. In 5 years but 3 hubs have been found broken in Baltimore and all of these were defective. In at least one city I understand, there has been some considerable breakage of the old American Gas Light Association hubs, and in connection with any revision of the standard this should be considered. On the whole, the standard should specify castings as light as is consistent with safety and durability.

Mr. E. E. Witherby—I move that this matter be referred to the proper committee under the new constitution.

Mr. Walter Wood—Mr. President, may I suggest an amendment to the motion; that the Technical Committee be requested to meet with the cast iron pipe manufacturers before coming to any definite conclusions. After the receipt of the letter of your Committee last summer, the cast iron pipe manufacurers had a meeting, at which from 80 per cent. to 85 per cent. of the tonnage made was represented. They asked your Committee for a joint session, so that all these questions of detail could be discussed, and some satisfactory standard to all concerned settled upon. I think my amendment has some appropriateness, and I hope it will be duly seconded. Another reason why it is very desirable to have the thing carefully worked out now, and especially for the future, is this: The manufacture of pipe in the past has been largely hand work. It is now becoming very rapidly automatic machine work; therefore, in preparing the tools for flanges and moulding machines for special sizes, it is exceeding desirable for the manufacturers and the customers to come to a common understanding. Speaking for the manufacturers, I think their feeling is that no one set of ideas should undertake to dominate the situation. The manufacturers wish to progress, and they wish to prepare a line of tools which shall be satisfactory to their customers. No manufacturer that I know of desires to throw anything in the way of progress, or is inclined to insist upon progress along their own lines. They do not regret any money that may have been spent in old patterns. In other words, the way to progress is to adopt the proper course, based upon a thorough and careful study of the conditions; therefore, I hope before anything final is concluded that my suggestion will be accepted. I suggest as an amendment, Mr. President, that the Technical Committee be authorized and instructed to ask for a joint session with the cast iron pipe manufacturers' representatives.

Mr. E. E. Witherby—I hope Mr. Wood will withdraw that amendment. I think when he comes to look at the personnel of the Technical Committee of this Institute as it now stands, he will realize that there is no necessity of such an amendment, and that when this Committee comes to a mature determination of what is best to be done, he will be satisfied with the result.

Mr. W. Wood—I should be very glad, Mr. President, to simplify the discussion by withdrawing my suggestion. I think the importance of it, however, is that there has been a great deal of discussion about standards, and to simplify and shorten our time here I want to illustrate what is in my mind by this one fact. The American Society for Testing Materials have adopted a series of weights and thicknesses for straight pipe. Except in a very few instances they meet almost exactly the classification that has been adopted by the Gas Institute, where the table that this Institute has prepared varies from $\frac{1}{100}$ to $\frac{1}{200}$ of an inch. It seems to me hardly worth while for such small differences to be made permanent. It seems to me we ought to try to find a common ground and clear away these minute

differences. It is very desirable to be done. That is the reason of the request that the pipe manufacturers made of your Committee, viz., that we should have a meeting and eliminate these small differences.

The President—Then I understand, Mr. Wood, you do not withdraw your amendment. The amendment is in order if you insist upon it, but I think Mr. Witherby's idea is the correct one, that the Committee certainly will not decide this question without consulting with the pipe men.

Mr. E. E. Witherby—That is it exactly, Mr. President. I do not think it is necessary to even consider such an amendment, for with a Committee made up as the Technical Committee of this Institute is now made up, all of those matters will be sufficiently safeguarded.

Mr. Walter Wood—Mr. President, if it is the understanding that such a course will be taken, it is as good as a motion to that effect. The thing I want is that united action be taken and a free discussion had so that these differences can be cleared away. I take it then that the letter which the cast iron pipe representatives addressed to the Committee will be accepted, and our Committee asked to meet them. If that is the understanding I am perfectly satisfied with it, and in that understanding I withdraw the amendment, if the gentleman wishes it done.

Mr. E. G. Cowdery—Mr. President, it does not seem to me that we want any understanding or agreement, and I would suggest that if Mr. Wood wishes to bring this up that he put it in the form of a suggestion, that the Committee, or a sub-Committee, be authorized to hold such a conference, but we should not give that Committee specific instructions as to what it is to do. The motion was to place specific instructions that it must do so-and-so, and that does not seem to me to be quite in order. To my mind, it will serve every purpose if we simply authorize the Committee to take such action in that line as may be in accordance with its plan of proceeding when it comes to lay it out.

The President—Mr. Witherby, let me make a suggestion? Will you make some slight alteration in your motion so as to cover what Mr. Wood desires?

Mr. E. E. Witherby—Mr. President, I think the original motion covers it fully; that this matter, instead of being cleared up now, as some people would like, be referred to the Tochnical Committee of the Institute for consideration. I think that is proper enough and covers it all - all that is necessary to include in it. I am perfectly willing, if I have any personal interest in the matter, to leave it to the Committee. I will abide by their judgment.

A Member—Mr. President, was Mr. Wood's amendment seconded?

The President—Yes. Mr. Wood's amendment to Mr. Witherby's motion is to the effect that the Technical Committee be requested, in the course of the preparation of their report to this Institute on pipe standards, to consult or confer with the manufacturers of pipe.

Mr. Walter Wood—It seems to me, Mr. President, there is a little misunderstanding, and I think it would be well for the Committee to understand exactly who those were that made the request. It came from some of the largest pipe manufacturers in the United States. and, as I said before, representing from 80 per cent. to 85 per cent. of the tonnage of cast iron pipe manufactured.

Mr. P. Thompson—Let me suggest that if Mr. Wood would change the wording of his amendment by putting it in the form of a suggestion or request, that the Committee take such action, it would be in better form to pass it.

Mr. Walter Wood -I am perfectly willing to do that.

The President—Mr. Wood changes his amendment then by substituting the word "suggest" for the word "request" or "instruct" Will that be acceptable to the seconder of Mr. Wood's amendment?

Mr. Donald McDonald (Louisville)—It is satisfactory to me, Mr. President.

The President—The seconder also accepts the amendment.

Mr. Walton Forstall—Naturally I am quite familiar with the work of the Pipe Standards Committee. As the report states, we tried to get the opinion of the pipe manufacturers. We did not reply to the specific invitation extended by Mr. Wood. This invitation came as from Mr. Wood and two other pipe manufacturers. One of them was the United States Cast Iron Pipe and Foundry Company, and it represented certainly two thirds of the 85 per cent. spoken of by Mr. Wood. On the receipt of Mr. Wood's invitation, I communicated with a Vice-President of the United States Cast Iron and Foundry Company, and received by wire and letter a statement to the effect that his Company disavowed any authority on Mr. Wood's part to speak for them, and that his Company was in accord with the Plates embodied in our report. These facts I in turn communicated to Mr. Wood. I think the Institute is very wise, if the members are not sure they desire to accept our report, to refer the whole matter to the Technical Committee. The Sub-Committee that will be appointed to look after this question of pipe standards will soon discover how difficult a task it is. They will discover that the 1898 standard, as talked of by some of it advocates, is not the 1898 standard as shown in the "Proceedings" of the American Gas Light Association, but a modified standard, which has never been communicated to the records of any Association. We will await the result of their labor with much interest.

Mr. E. E. Witherby It seems to me that the history of these different standards during the past few years is a very good criterion to judge by in this case. It is a matter which needs further study and investigation. I would like to see something done, and I would like to get to the end as soon as possible. All that any one of us wanted to see, I think, is that no direct or positive instructions should be given to this Committee at this time. As the gentleman has just said, it is a committee which should command the entire confidence of the Institute. I wish you would all read the names.

The President - No instructions are involved in Mr. Wood's motion as it now stands.

Mr. Donald McDonald—In seconding that amendment again, I feel just as I did when I first seconded it, that we do not want to make any arbitrary changes and force a change in the patterns unnecessarily. I think it is a matter that can be decided by letting both sides express their views fully. I think that we appreciate the situation of the manufacturers, and that the members of this body want to meet them in a reasonable way, and to agree on a standard that we recommend. It will be that much more desirable, and will have a much more binding effect upon everybody; and, therefore, much more liable to be adopted.

The President—The question is on Mr. Wood's amendment as seconded by Mr. McDonald. Those in favor will please say "Aye". Contrary minds, "No". It is carried. The question is now on Mr. Witherby's motion as amended, that the whole matter be referred to the Technical Committee, with the suggestion that, in coming to their conclusions and before reporting to the Institute, they confer with the pipe manufacturers. Are you ready for the question? Those in favor please say "Aye". Contrary minds, "No". It is carried.

Election of a Secretary-Treasurer.

The President—Are there any nominations for Secretary-Treasurer?

In response the Special Nominating Committee handed in the following report:

We, the undersigned members of the American Gas Institute, nominate Mr. James W. Dunbar, as Secretary-Treasurer, in accordance with the recommendations of the Board of Directors.

A. C. Humphreys,	A. G. Glasgow,	Paul Thompson,
A. S. Miller,	E. H. Earnshaw,	J. J. Humphreys,
Donald McDonald,	A. D. Whittaker,	W. Forstall,
F. N. Morton,	L. D. Spragle,	A. E. Forstall,
Carroll Miller,	W. C. Morris,	W. H. Gartley,
W. O. Lamson, Jr.,	G. W. Clabaugh,	Geo. Old,
Geo. Waring,	E. G. Pratt.	

The President—Gentlemen, you have heard the nomination of Mr. Dunbar for Secretary-Treasurer by this Committee. I presume that is in accordance with the previous understanding. All in favor of the election of Mr. Dunbar, please say "Aye." Contrary minds, "No." It is unanimous.

A Vote of Thanks.

Mr. E. E. Witherby—While there is a fair representation present, I would like to make a motion. There has been a lot of hard work done here by the Committee having charge of the local arrangements, and so I move that a vote of thanks be extended to the Committee for the very able manner in which they have handled the arrangements. Seconded and adopted.]

Mr. P. Thompson—Mr. President, it occurred that there are perhaps some committees which have not reported, and as under the change in the Constitution which has been made all of these matters will have to be referred to the Publication Committee, it seems to me it would be a good idea to pass a vote referring anything that may be in existence in the committees to that committee. I, therefore, move Mr. President, that any committee not reporting be discharged from any further consideration of the subject referred to them. [Amended and adopted.]

ADJOURNED.

The President—Is there any further business to come before the Institute? Gentlemen, before we adjourn let me say that there are many things it seems to me we have reason to congratulate ourselves upon, but especially it seems to me that we come to the end of a rather strenuous meeting, with mutual respect and loyalty, and that we should go from here with a mutual determination to make this Institute a success; or, as I said in my address, the leading light among scientific men devoted to the advancement of the Gas Institute. If there is no further business I will declare the Institute meeting adjourned *sine die*.

Observations of the Methods of Handling the Lighting Industry Abroad.—Business Promotion.

[A paper read by MR. R. M. SEARLE, at the New York Meeting, National Commercial Gas Association.]

The first thing that impresses one is the extreme neatness of offices and appliances. The exhibits of appliances are always arranged attractively, properly and neatly connected for prompt demonstration, and show every evidence of being blacked, polished and inspected daily. One does not find the streaks left from striking matches on appliances, tray pans full of dead flies, and price tickets that one would have to take a nail brush and soap to find the figures. Then the long time association with appliances has resulted in all the employees being intelligently familiar with the various commercial uses of gas, and, therefore, able to answer questions right off the reel.

Again, they have so thoroughly appreciated the value of connecting numerous heaters and water heaters to the flue that they are getting most excellent increases in the sales of gas for these purposes, because the absence of odor induces one to use appliances of that kind liberally.

It is also generally observed that the character of the service rendered by the distribution department goes farther to get into use and keep in use the various appliances installed. They now seem to agree with their American friends that pressures at all hours of the day (approximating 3 inches and higher) are the most desirable from every standpoint. All conceivable inducements to prospective users of appliances of all kinds are generally offered, and they all agree that the liberal policy is the dividend earner. I quote from a paper I heard Mr. John G. Toonis, of Waterford, read at Dublin, in June, 1907:

"There are now some gas undertakings the outdoor departments of which are conducted on modern and up-to-date commercial lines. Facilities are offered to existing and prospective customers to acquire gas fittings and any other gas using apparatus on hire, purchase, and for cash at low yet remunerative rates; the proper fixing and maintenance of all appliances are carried out and their systematic inspection is attended to so as to insure that gas is being consumed to the best advantage. Such methods constitute real, live forces, having an enormous effect upon the development of consumption where they are introduced, and the welfare of the gas industry in general. Any gas undertaking conducted in the above manner, with the addition of the usual adjuncts of a well managed commercial enterprise—such as advertising, etc.—will make more substantial progress and will serve its customers better than will any otherwise well managed similar undertaking selling gas from 20 to 30 per cent. cheaper. In the latter case, possibly, beyond fixing slot cookers and meters, little is done for the customer, who is left to his own devices, or oftentimes to the tender mercies of the plumber and bell-hanger.

"It is essential for the progress of small works that all the gasfitting required in their respective districts should be carried out by the undertakings. Should this be not the practice, however, there is no reason why, if the manager be competent and has the necessary energy, he should not capture such business in a very short time. The writer has lately been much surprised to note a tendency on the part of some large undertakings to depute a portion of this work and its responsibilities to third parties—ironmongers, etc.; and can only presume there must be special reasons for this, to his mind, distinctly retrograde movement, which even in principle seems to have very little to recommend it. He believes that it will result in absolute failure compared with other undertakings carrying out the business themselves on modern lines. In Waterford 99 per cent. of the total gasfitting work is executed by the Gas Company; and in connection with the other works referred to in Table I. a similar state of affairs exists, the consequence being that the undertakings are, through their outdoor staff, kept in intimate touch with the customers and their requirements. In this connection a scheme has been adopted whereby apprentices of a superior order are obtained from the trade classes of the technical day schools, which it is expected will in time bear good results.

"Arising out of the fittings business, there is the question as to whether a profit should be made on this department; and if so, what percentage. In the writer's opinion, it matters not whether the profit be nil or only sufficient to cover incidental expenses—say 10 or 20 per cent.—so long as the business be got and the prices do not preclude people from becoming customers. Oftentimes it would be good policy to incur a loss on such work in order to obtain an increase in gas consumption.

"There has been during the past few years a fairly general awakening of gas authorities as to the possibility of development of sales of gas for all purposes; but it is surprising to find so few undertakings making any real attempt to take advantage of the opportunities known to exist close to their very doors. No undertaking should wait for business to come in, but all should go out and seek it. It has been said that electricity competition has been a blessing in disguise to the gas industry. In so far as it has been the direct means of forcing gas undertakings to set their house in order and to conduct their outdoor service on modern and commercial lines, the author is prepared to accept the statement. In Waterford, the principle for many years has been to anticipate the advent of electricity, or any other competitor, by carrying on the gas business as if the most deadly competitor were being contended with, so that if ever such competition has to be met the undertaking will occupy a very strong position, and it will not be patent to the public that the company only bestirred itself after the arrival of competitors—which will be an asset very few undertakings have had any claim to. The best possible service, with adequate pressure of gas at all times, along with immediate attention to complaints, has gained many friends."

What he says is what has been said here and is well worth repeating. Again, let me quote from Mr. W. F. Goodenough, of the Beckton Gas Light and Coke Company, London. Both these men I quote from were so painstaking that I feel the only way I can thank them is to tell you, if it is your good fortune to meet them, to interrogate them for all you are worth. They are full of enthusiasm. Mr. Goodenough has posted in prominent positions in all shops and offices the following:

"Every officer and workman in the department is enjoined to remember at all times that the policy of the Company is to give prompt attention and complete satisfaction to every customer, so far as that can possibly be done without prejudice to the best interests of the Company and its other customers. It is the customers' money that pays our salaries and wages.

"Let every man realize—as, happily, most of the Company's men do realize—that the Company's prosperity depends upon the thorough satisfaction of their consumers, and that his prosperity depends on that of the Company. Men who do not realize and act upon those facts are not wanted. Men who do will find the Company a good friend.

"Occasionally, the Company's workmen have to deal with consumers inclined to be unreasonable, ill-tempered, or even abusive, especially in cases of disconnection of supply for non-payment. Particular care must always be taken to show every possible courtesy and forbearance towards such consumers, and to avoid loss of temper, the display of any personal feeling, or the resentment of abuse—which it should be remembered, only reflects upon him who resorts to its use.

"Where it is found that a consumer has, without apparent reason, a grievance or prejudice against the Company, courtesy and discretion on the part of their servants may often discover and secure the removal of the cause of such grievance or prejudice. In any discussion with a consumer, speaking loudly or excitably should always be avoided. A quiet, confident and respectful manner carries more weight than any amount of bluster, which only irritates and offends.

"The qualfications of a gas salesman comprise: Informed intelligence, a courteous manner, a good temper, and, above all, tact. The last named is one of those things which, like 'good taste,' elude definition. Mr. John Morley once said, in regard to definition, 'I can't define an elephant; but I know one when I see one.' So one may say one cannot define tact; but one knows it when one encounters it. Possibly the nearest approach to a definition is to say that tact is the gift of seeing and appreciating the points of view and the feelings of those with whom we are dealing, and doing all in our power to consider those feelings and to meet those views in a reasonable spirit

This, it will be agreed, is essential in every officer of any business concern who has dealings, whether as salesman, collector, or head official, with its customers; and how much more so in the officers of a Company having a statutory monopoly (that dog-hanging name) or of a municipal undertaking, handicapped as to popularity by its close connection with that most unpopular of creatures—the rate collector."

Commercial men are both paid salary and commissions, salary alone, and commission alone, all having their advocates. Each one where zeal is shown proves good practice for them, and when analyzed shows how far zeal and enthusiasm will carry your business. Let me quote Mr. Goodenough again:

"The policy of its gas sale department must be one of prompt, courteous and skillful attention to the requirements of its customers and of conciliatory treatment of all complaints, which, when unfounded, are generally due to misapprehension, are rarely made from a desire to give trouble, and should never lead to the complaining consumer being regarded as a nuisance, but rather as a person to be converted into a satisfied, and, therefore, more ready, user of gas. The public as a body are very reasonable; and even an unreasonable man finds it difficult to be so if the undertaking's representative persists in regarding him as one who only desires what is just and fair.

"The policy of the collecting department (which should be in the closest co-operation, if not actually amalgamated, with the sales department) must also be animated by the spirit of consideration and conciliation; so that the customers may at all times feel that they are being dealt with justly and considerately, and that the powers of a monopoly are not being unduly brought to bear upon them. To give an illustration of the sort of question between supplier and consumer that leads itself to conciliatory treatment. Many gas managers have had cases occur in their districts in which a consumer's account has been greatly increased through an escape on the internal fittings which has not been noticed for some time owing to the gas getting away into the open air. The consumer is, of course, liable for the gas wasted; but why should the Gas Company desire to benefit by his misfortune? The gas has only cost them the coal and the bare manufacturing charges—why should they ask for profit on what the consumer never wished to buy and has made no use of? If this view be taken, and the consumer only asked to pay for (say) half the wasted gas at the selling price, the supplier will be covered and the consumer fully satisfied with the equitable treatment he has received.

"All correspondence with consumers must be carried on in a friendily and accommodating, instead of a harsh and stiff-backed spirit; the writer always remembering, moreover, that the reader can only read what is written, and that it is, therefore, essential that he, the writer, should take care exactly to express his meaning and attitude, and not to give rise to misunderstanding or friction by failing to let the spirit which animates him appear in the written word. It is the fact that correspondence so often fails to convey to one party the actual feelings and attitude of the other that makes it desirable to deal with consumers in person rather than by correspondence. A conversation of 5 minutes will often do more good than twice that numbers of letters. The letter-writing habit is one that should be carefully guarded against.

"The sale of fittings, stoves and apparatus of all kinds on the extended payment system is undoubtedly of great value in developing the sale of gas; while the hiring out of cookers and fires is now so general, and has done so much to popularize the use of gas for fuel, that the barest mention of the system will suffice here, though it must be confessed that the author has been astonished to hear of so many gas undertakings still lagging behind on the question of letting out fires on hire.

"Gas fires do not result in such large consumptions, taking the year through, as do gas cookers; but the consumptions are very good and acceptable, so that, provided the rents charged are adequate to cover interest, depreciation, repairs and exchanges, it is difficult to discover any sound argument whatever against letting gas fires on hire, and endeavoring to get them fixed in every bedroom and 'occasional' room, if not in every other room, in every house. One indirect advantage that has grown from the hiring out of gas fires may not have occurred to some, and that is that the success of this system has led those in the electrical industry—thinking that what is good for the gas industry must be good for them—into wasting their energies and resources in pushing electricity for heating at a price which, considering the poorness of the load factor and the frequent coincidence of the heating and the lighting loads, is considerably below cost. They are thus weakening themselves for meeting our competition in he lighting and power fields. It has been found that the poor heating result obtained from electric radiators at considerable cost, coupled with the fact that the ventilation of rooms in which they are used is seriously impaired as a consequence, have proved in many cases a good advertisement for the advantages of gas for heating."

Their experience with plumbers handling gas appliances has resulted in the same unsatisfactory service to consumers that we find in this country. Slow moving, careless connection, indifference as to final results, and if anything goes wrong blame the gas man.

In some places I was confronted with a condition which always seemed ideal, but when accomplished, so far as the manager is concerned, results in disappointment, and that was a city where 95 per cent. of the houses had and used a gas range, etc. While this condition is a long way off here, it is quite the natural thing to expect, and after it has been accomplished some of us will certainly do as they have to—hustle to make a showing.

I purposely refrain from statistics, and am, I know, generalizing, but I have learned that our brothers over there know how to do things too, and as for courtesy—they did everything to make things pleasant and agreeable, going to the greatest extremes to give me information asked for.

The Commercial Side.

[An Address delivered at the New York Meeting, National Commercial Gas Association, by DR. A. C. HUMPHREYS, President Stevens Institute of Technology.

I am asked to speak to you on the commercial side of the gas business. It gives me pleasure to make my small offering towards the forwarding of your important scheme for the maintaining and upholding of the gas business through its commercial side. What I have to say will I think be found not inapplicable to industries other than that of gas.

We are constantly hearing discussions as to the relative importance of certain elements necessarily found in many undertakings; for instance: Theory *or* practice; college education *or* school of experience education; technical management *or* business managemen t; labor *or* capital.

The Book tells us: "Eye cannot say to the hand, I have no need of thee." If we change the "ors" to "ands," the question in each case is resolved.

To-day in the gas business, as in many other branches of industry, we need to secure the fullest possible service from those trained to the highest possible degree for efficient commercial management as well as those specifically trained for the construction and operation of the manufacturing and distributing agencies. It is quite usual to refer only to the latter as covering the technical side of the business. I think this is misleading to confine the term "technical" to that which has to do only with the engineering side.

There are technicalities connected with all industries, and these are not confined to the design and construction of plant and to the manufacturing and distributing of product. Necessarily, in the commercial branch of any important industry, there are special technical elements in addition to those technical elements common to all; as an example of the latter, I may cite scientific accountancy, an element which may well receive more complete recognition in the United States. It is of vital importance that the plant's product shall be of the required quality, and manufactured and distributed at the minimum of cost compatible with the required quality, This means that the plant must be efficiently designed, efficiently constructed, efficiently operated and efficiently maintained—a wide enough field, in the case of large undertakings, to engage the best thought and effort of the best men. But the product must be sold and the proceeds collected; the needs of present and possible purchasers of product must be carefully studied and means adopted to meet their wants so far as consistent with the legitimate interests of the sellers: the accounts must be so kept as to reduce to a minimum the loss from bad debts and to furnish the means for the complete and competent analysis of the results, which can only be done by means of an adequate system of accounting, religiously maintained every moment and at every point.

And here is one of the many places where there must be complete and loyal co-operation between the engineering and commercial sides if the best results are to be obtained. It is to be remembered that the accountant gets many of his primary records from the engineer and those under the engineer's control. If these primary records are incorrect, certainly the final records as found in the general ledger

must of necessity be inaccurate; and for analysis and comparison of records for the purpose of improving results, inaccurately classified accounts may easily be worse than useless. This accurate co-operation of departments is necessarily included in all good business management. Here let me differentiate between the terms "business" and "commerce."

Commerce is defined as the exchange of goods, productions, or property of any kind. Here appears distinctly the element of trading. Commercial is, therefore, defined as "of or pertaining to or of the nature of commerce; mercantile."

Coming now to the gas business in which the engineer, the industrial manager and the commercial man are all interested, the commercial element has to do with the trading side. Does it follow, then, that the designing, constructing and producing engineer is not interested in this part of the business? Is he absolved from all responsibility in this direction? I think not.

The man of commerce should here be the responsible specialist, but he requires the co-operation of the engineer. For instance, as to what methods and appliances can be safely and economically employed for converting gas into light, heat and power; again, as to the proper classification of accounts. Many other instances could be cited. As the commercial man is charged with the selling of the product, he is also charged with the duty of increasing the sales along lines already established; and here he needs but little assistance from the engineer. But he should go far beyond this – he should keep constantly in mind the problem of enlarging the field of usefulness for gas, and here he must secure the co-operation of the engineer, and for this service the engineer is more likely to be efficient if he has commercial sense. This is an age of closer and closer specialization; and necessarily so, in view of the immense strides made of late years in the science of engineering, which naturally has led to a commensurate broadening of the field of commerce. Here we find another question raised: Special training *or* broad training? Again I say, change the "or" to an "and."

A man to take more than a minor or subordinate position must be trained as a specialist along one line and, at the same time, must be trained to take a comprehensive and comprehending view of the ground surrounding his specialty. And the man who aspires to take a commanding position in any industry must be sufficiently informed in all things connected therewith to supervise and give general directions to his several heads of departments. But still we must come back to the thought that, after all, for the highest efficiency in any industry, there must be specialization and concentration in the several elements involved in the industry, and the majority must be satisfied to be specialists (that is, re-specializing *within a specialty*) if they are to be thoroughly efficient.

As I understand, the members of this Association as such, propose to devote their efforts to the improvement of methods and appliances tending to further popularize the use of gas as a sources of light, heat and power. This can in part be done by increasing the efficiency of the appliances, thus giving the same useful effect for a smaller money expenditure or giving a greater useful effect for the same money; for the gas man, be he connected with the engineering or with the commercial side, must be prompt to recognize that the true interests of the consumers must control; and here in the long run duty will be found to accord with self-interest.

When I first entered the gas business about 35 years ago, too many of the gas managers completely failed to appreciate that the interests of their companies and the interests of their customers were largely identical. The gas man was too apt to be dictatorial and careless of the sensibilities and the rights of the gas buyer. The result was inevitable—the public came to believe that the gas business was conducted along unfair lines, that just complaints were disregarded, and that the instrument used to determine the amount of gas consumed was worse than unreliable. This has been greatly changed as to nearly all gas companies; to some the indictment was never applicable, though all were declared guilty.

Now it is the exception when a company is found advisedly doing business along these old and bad lines; but this does not mean that the millennium has arrived with us any more than with others. It is only by constant vigilance that we can be sure that our subordinates are treating our customers uniformly with intelligent courtesy. The commercial side must be keen to observe whether the office man, and especially those at the complaint desk, are sufficiently well informed and have their tempers sufficiently under control to meet unreasonable complaints with a pleasant face and convincing arguments. It might be a good test, if, when a complaint was made, we expected our men to see to it that the customer should not only be placated but, before leaving the office, be persuaded to try an additional gas consuming apparatus.

In a general way the commercial side has to do with the selling of the gas which is manufactured and delivered to the house by the engineering side. But, as I have endeavored to point out, certain responsibilities must be shared by these two departments; perhaps the most important being relations with the public and the municipality which involve technical questions connected with both sides of the business.

Many of the more progressive companies have wisely established separate departments for the promotion of sales; fortunately, this advance has not been confined to the largest companies.

In the larger companies, where there have been established employees' classes or meetings for study and interchange of views, this new business department, including the study of new appliances and improvements in old appliances, is receiving its full share of attention. Here is where a large measure of dependence must rest upon the commercial manager and the appliance manufacturer; and we gas men may well be encouraged by the recent great improvements to, and increase in, the variety of gas appliances. I have already drawn attention to the necessity for concentration and specialization in the conduct of any industry.

To refer to the engineering side, see how the advances in engineering science during the last 50 years have brought about a further differentiation. Now, instead of the simple classification of Military Engineering and Civil Engineering, we have the latter divided into Civil (as a section of the field only), Mining, Mechanical, Electrical, Marine, Chemical, Electro-Chemical, Sanitary, etc. Then most of these divisions are being again sub-divided and re-subdivided. The gas men and electric light men are not always in opposition, so we find them working together as illuminating engineers. This division and sub-division of the field of engineering necessarily leads to much overlapping which has resulted in the discovery that only by affiliation on the part of the several engineering societies can the best results be obtained. Sometimes this effort at affiliation is governed by geographical considerations, but I am particularly referring to professional or vocational affiliation.

At the time of the meeting of the American Society of Mechanical Engineers, held a month or two ago, a body of men especially interested in gas power met to form a new society, but decided first to try to work through affiliation with the powerful Society named. This affiliation is now under consideration in the hope of finding some common ground for efficient co-operation. Many of these men are members of the Mechanical Engineers' Society, others are not members, and perhaps might be found technically ineligible to full membership, but still they are capable of rendering valuable service in the discussion of certain gas power problems. Here the suggestion naturally follows, let these men, through a wise scheme of affiliation, work on an *equal footing* with all others interested *as far as this particular branch of industry is concerned* and so secure the co-operation of all those eligible for the discussion of *any* of the problems of gas power. I quite appreciate that there are very grave obstacles to be removed before such schemes of affiliation can be put into effective operation—some of the obstacles are real and fundamental and some have to do with the narrowness of vision with which most of us, perhaps all, are afflicted though in varying degrees.

Here in gas power we have what seems to be a somewhat narrow division of the engineering field. From one point of view it is a division of the specialty of gas engineering, which in turn is made up of branches taught under the heads of Mechanical, Civil, Chemical and Mining Engineering. But gas power would have to include gas motors, and then would naturally follow carriage building and upholstering; so the carriage builder and the upholsterer naturally come into the discussion of certain gas motor problems under the general head of gas power; and if the services of these men are to be secured, they should preferably come in on an equal footing.

It must be recognized, however, that the doors of our several parent engineering societies cannot be thrown open indiscriminately; and this through no professional snobbishness, though this latter may easily creep in if not guarded against. Also we must have sufficient protection from the patent crank and the blatant advertiser. The appliance man must come to these discussions prepared to meet and profit by all fair criticism.

But it is natural that, in the main divisions of engineering, as represented by what we may style the parent societies, certain professional considerations should control, necessitating a professional or voca-

tional qualification as to membership. Furthermore, just as it has been found convenient in the interest of efficiency for the engineers to combine under separate organizations, as, for instance, the Civil, Mechanical, Mining and Electrical, so the same influences lead to the organization of other associations in the interest of other specializations and sub-specializations. The same man often belongs to several of these societies, and still we know that this does not mean that all the societies to which this man belongs might profitably amalgamate. We know that it is in the interest of efficiency for them to work under the several heads, and we know further that the necessity for closer and closer specialization will lead some of these same men to combine with others in the organization of still other societies still more closely specialized as to purpose. We must, therefore, fully recognize that affiliation does not mean absorption.

Affiliation might be secured by men of a certain interest combining so as to become a co-operative division of a parent society in connection with a certain part of the parent society's field; but is it not likely that in turn this certain part of the field might have to be subdivided? If so, confusion would follow. As I see it now, though I confess I am not doing much more than thinking aloud, it would be better to maintain the separate organizations, with working agreements as to interchange of results, the professional society referring special subjects for investigation to the affiliated society, the two societies to meet for discussion whenever their investigations were sufficiently advanced for efficient joint discussion.

I have hesitated to refer to this subject of affiliation at this time because it is not my custom to speak until I have thought. But, speaking as a member and not an officer of the American Gas Institute, I believe that much good can be secured by co-operation between the Institute and your Association. Then the question is, Can this co-operation be secured without loss in other directions?

I think it is particularly important that certain able men, directly and indirectly connected with the gas business, should have the opportunity and the encouragement to meet on an equal footing to discuss the commercial side, and especially should this opportunity and encouragement be offered to those men who are not eligible to full membership in the Institnte; for instance, the men who sell to the gas companies the apparatus, supplies, materials and appliances, upon the quality or efficiency of which so much of the success of the gas companies depends. There must necessarily be an overlap in the work of the Institute and your Association. This is seen at once by looking over your membership list, which includes the names of many who are active members of the Institute. This partial membership common to both societies should be a strong influence making for an unselfish policy of efficient co operation.

With all the problems yet to be solved in connection with this industry of ours, many of these problems having to do with the utilization of our product along new lines for light, heat and power, calling for the inventing of new and perfecting of old appliances, we who are directly interested in gas undertakings can well afford to encourage on every reasonable way the full co-operation of all who are capable and willing to render service.

In conclusion, let me say that, so far as my personal efforts and influence can go, they are now and here pledged to a full measure of such co-operation.

At the conclusion of his address, President Humphreys continued as follows: I am moved to say further, in addition to what I have formally prepared in my paper, after sitting here and listening to the most interesting and instructive papers and discussions which have been presented here this morning. I fear in saying what I am about to say I may be misunderstood, and I see present a fellow Alumnus of Stevens who may so misunderstand me unless I am careful to properly express myself and he is careful to take in my meaning. At the annual meeting of the Stevens Alumni, which is to occur in a little less than a month, at the annual dinner at which I am expected to speak, I am departing from my usual practice in presenting a prepared paper rather than as usual a familiar talk, and the paper is on the very subject I have just treated—though I did not really appreciate it when I wrote this paper—it is very much in line with what I have written here. In this address I am trying to voice the idea which I have had since I have been President of Stevens Institute, and many years before, that the engineer must be a man alive to commercial conditions. If I were asked to advise our seniors, who are likely to be brought in as affiliated in connection with such a plan as I have outlined, and so be prepared to go into the Association of Mechanical Engineers as full members later on—If I was asked by these men the following question: I can only attend one of two meetings, which shall I attend? I would say, attend a meeting such as this. I will tell you why. You do not have to persuade these men to go to the meetings of the engineering societies; they naturally go there; but it is hard to get the engineering student to understand that the commercial side is very important, that without the commercial side he is not an engineer, rather a scientist. If they ask me such a question, I would say, go to both if you can, of course; but, in view of your tendency in the other direction, and to meet that tendency, go to the commercial meeting. [Applause.]

Why a Commercial Gas Association is Beneficial to the Gas Industry.

[A Paper read by Mr. CHARLES A. LEARNED, Meriden, Conn., before the National Commercial Gas Association.]

There are some things which are self-evident, the subject of this paper is one of them. The uniting of forces dates back to Adam. In union there is strength; the association of gas men the world over is no exception. In the maintainance of our business there is little we can do single-handed. A little less than 40 years ago the gas men of this country realized that they needed help from each other by an interchange of ideas. There was no competition between them then, there is none now, so they came together; but times have changed and with them the general conduct of our business. They were gas makers, and poor ones I will not say what we are. Their thought was how to get the gas out of the coal, clean it a little, and send it forth on its mission. They followed it a little way out through the small and crooked mains and then they let it go, the poor customer must do the rest. It is a wonder he ever got any light.

Those pioneers formed themselves into an association, the annual meetings were conducive of great good, papers were read, discussions long and lively were entered into. The wrinkles of those early days were crude ones, but effective. Each man, however, who went to give and get good felt repaid for the journey and the expense.

Nearly 20 years passed, but at each meeting the manufacture of gas was the all-absorbing subject with just a sprinkling of papers on distribution, in large cities; hardly a word in regard to anything inside the house or store. What changes these last few years have wrought! The gas man with his desk behind the holder, I will not say has been forgotten, for he still has his place, but the great field of distribution and appliances has come to claim a large share of our attention, At first the change was slow, the cooking and heating devices were very simple, our ideas came from our cousins across the water, whose appliances were clumsy and poor. We hailed the day, however, scarce 20 years ago when the plate, the heater and the small stove came shyly in to claim our attention. It did not take long to put American ideas into the goods and bring out real commercial appliances which have improved in quality, design and ingenuity with each succeeding year. We looked at them with eyes askance and said: "I don't know. Can we sell them when gas is so high?" And how short-sighted we were. We did not see this day and yet we are in our infancy gas wise, if we did but know it. We will look back some day and say how simple we were; we thought we knew it but we didn't. It is true that great strides have been made in the last 10 years and we realize now that our business has changed from one of only making gas to one of selling it as well.

The commercial department has become a most important factor. As we study the appliance problem we find we are only skirting the edges of what may be done with our commodity, and no one realizes it more than he who sees in our houses, our hotels and our factories some other article than gas used where gas might be supplied scientifically and economically. We have made the gas, we have sent it out, we have sold an appliance and it has brought us great incrsases to our business, we have rejoiced in the good results, but have we remembered who has helped us these many years? Apparently we have not. Until recently he has been a hanger on, so-to-speak, in our associations, this great benefactor. He has been ridiculed if he made a mistake, or his venture was a little in advance of the times. He at least has not been recognized as he should have been.

When 2½ years ago there was a movement to unite these scattered forces into a body with one great aim in view, the movement met with favor, for it made a missing link; it put the appliance manufacturer and the gas manager together, the commercial man in our office alongside the gas maker and the engineer. This, then, makes a Commercial Gas Association, and it cannot fail to be a benefit to the gas industry. The wonder is it had not come before.

The manufacturer wants to know our ideas of his appliance. He wants some place that is common ground for both to stand on. He believes he can benefit the gas man and wants to tell him so in some association, or convention, where they have equal rights, where they meet on the level. No matter what we may say or how we may feel about it, the appliance manufacturer has made the commercial end of the gas man's business largely what it is to-day. He has worked hard, he wants to get in closer touch with his customer, and in the Commercial Association he feels at home. Let us welcome him and show our appreciation of his efforts.

I realize that in these few remarks I have wondered from the commercial man and his association with his part in the sale of our product, to the manufacturer who supplies the appliances, but one, however, cannot be separated from the other, they go hand in hand.

The minor benefits which such an association derives is in the exhibition of all kinds of appliances in one place, where the criticism and the commendation are mutually beneficial.

In closing I would say let us show the same interest in the commercial and appliance end of our business that we have shown in the manufacture and distribution of our product, then our Commercial Association cannot fail to be of lasting benefit to the gas industry.

An Obstacle to Gas Cooking and Heating.

The *Journal of Gas Lighting* says that it might be of some little interest and utility if the precise effect upon gas consumption of the increasing habit of Londoners and others to become dwellers in "flats" rather than in houses, were ascertained. Where such a mode of living is general as, for instance, in Edinburgh and other Scottish towns—it is well known that it must be fully taken into consideration when making any comparisons as to gas sold or number of consumers per mile of main. So, too, the question of rent plays its part in determining the congestion or scatterdness of the human family; and also, incidentally, as to the amount of gas consumed on any given basis. The recent instructive report, issued by the Board of Trade under Mr. Lloyd-George, on the cost and manner of living of the working classes, indirectly bears upon the same topic. When one knows that, after London, Plymouth is the next most highly rented town in England, it partially assists in explaining the always high figure of consumers per mile in that town. Of course, many other circumstances arise to be taken into consideration; but all we say is that rentals and methods of living are both important factors in the quantity and manner of gas consumption.

The habit of "flat" life - resorted to as a refuge from, or mitigation of, evils both financial and domestic—should, it would seem, be of great advantage to gas undertakings. If carried to any extent, it signifies less extension of mains and greater concentration of effort. Being a resource from domestic and household cares, it implies a larger demand for labor-saving appliances and increased conveniences in the shape of gas fires and gas cookers. In this particular direction, is as much attention being given as is deserved? Can the prospective flat-holder, small or large (and generally the former), at once see and secure the appliances most suited to his requirements? It does not follow that the size or design of gas fire or oven most suitable for the rooms of a house will of necessity be the best also for a flat installation. The circumstances and surroundings are different in the two cases; and the good business man and manufacturer will see to it that his wares are exactly suited in design, price, consumption, and utility to the very situation and purpose for which they are demanded.

That is really by the way; for the connection between "flats" and gas has been brought to our personal notice quite recently by an obstacle to its adoption in them rather than its increased use by them. The flats we refer to are suites of rooms built in large barrack-like blocks in various parts of London, but principally, perhaps, in the Western and South-Western districts. They are built and managed by large financial and land companies, controlling, in some instances, what are almost small towns in themselves. They make rules and regulations for themselves, their tenants, and their estates. Among their rules is one to the effect that all gas-fitting shall be done by their own working staff. Their minimum charge for fixing a gas fire or cooker—however simple the operation may be—is generally 10s. The result of this is that, after the unwitting tenant has carefully chosen his gas fires or oven, and they have been duly delivered by the gas company, he finds this exorbitant minimum charge thrust upon him; and in some cases he elects to go without his desired gas conveniences rather than pay a fancy gas-fitting bill to his none too obliging or generous landlord-company. Appeal to the gas company's men who deliver the goods to do the fitting as well, is generally met with the reply that they are not allowed to erect, but deliver only - rather wasted or duplicative labor, one would think. Sometimes, as we know, the offer of a shilling or so is enough to induce the gas company's men to disregard any limitation to their work; and they gladly and quickly carry out the required fitting. But whether they be so persuaded or not (and to their credit, be it said, that in the case referred to they did the work), here is a decided handicap to the extended use of gas in just the place where its development ought to be the most marked. Where the flats are larger and more expensive, and where perhaps the lighting is effected by electricity, the difficulties attending the introduction of gas fires and cookers are even greater. If gas is already laid on, the mere installing of a gas-cooker where one has been before involves the minimum payment of 10s. If no provision at all has been made for gas—or but little—the would-be gas consumer is assured of a pretty heavy bill from the monopolistic fitters, the landlords.

The freer the commodity sold, the greater the sales; and such restrictions as we have referred to cannot but retard the consumption of gas. If this has been the case, as it has in particular instances within our own knowledge, it is probable that it is also so generally. No doubt at the time that large blocks of flats are being built, arrangements are entered into between the estate and the gas companies; and perhaps the future care of the tenant in gas matters is not fully considered. But it appears to us that it would be well to safeguard future gas clients from any negligent or extortionate gas-fitting. Gas for cooking and heating is now of especial importance in flats, and proper provision should be shown by gas companies for the gas welfare of such dwellers.

Fuels for Gas and Gasoline Engines.

Mr. Amos Hardy, writing in *Iron Age* on this topic, said:

Gasoline.—The specific gravity of gasoline and the time required to volatilize it affect the running of the engine, as well as the ease with which it can be started, especially in a cold climate. A simple test for volatility consists in moistening the hand with it and noting the time it takes to evaporate. Stove gasoline, commercially known as 74 test, which is commonly used in engines, evaporates in about 7 to 10 seconds, leaving the surface of the hand perfectly dry. Gasoline of 60° Baumé requires from ¼ to ½ minute to evaporate. If there is any greasy residue left on the hand the fuel is not fit for use in the ordinary gasoline engine.

The instrument used to test the specific gravity of gasoline, the hydrometer, consists of a glass tube closed at both ends, containing a quantity of mercury, with a bulb at the bottom and having a degree graduation known as the Baumé scale.

Liquid fuels of lower specific gravity, down to 56° may be used successfully in the ordinary gasoline engine, although it may become necessary to heat the air before it is brought into contact with the fuel. This can be done readily by inclosing the exhaust pipe with a sheet iron cylinder 1 to 2-inch larger in diameter than the pipe, and connecting the air supply pipe to this cylinder. For starting the engine on low grade fuels when it is cold, it may be necessary to use gasoline for a few minutes, until the engine has warmed up sufficiently to allow the heavier fuel to be vaporized. The design of the fuel admission device may have considerable effect on the way in which a low grade fuel can be used. A number of gasoline engines as now built can use 56° distillate, even for starting at moderate temperature, without the necessity of heating the air.

Illuminating Gas.—When using illuminating gas, owing to the uniform quality and steady pressure with which it is usually supplied, few difficulties encountered in the operation of a gas engine may properly be blamed on the fuel. It must be remembered, however, that to obtain the best results of which the engine is capable, the adjustment of the amount of gas and air in an engine depends on the heating value of the gas in each locality. The engine may have been adjusted properly in this respect in the factory, but when set up under different conditions and using a fuel different from that with which it was tested, the proportions of gas and air may have to be varied. This can usually be accomplished by means of the gas cock or throttle on the engine. The opening in the plug of this cock must

be large enough to admit a sufficient supply of gas at the lowest pressure during the day, with the cock fully opened. Slight fluctuations in the pressure are not liable to affect the running of an engine to any great extent, as the pressure regulator in the supply pipe, or the rubber bag, take care of such variations in pressure.

Natural Gas.—Few gas engine factories have natural gas available, and the engines are therefore tested with illuminating gas, which usually contains only about two-thirds of the heat value of natural gas. Therefore an engine adjusted for artificial gas must be differently adjusted for the richer fuel. As it requires only 12 to 15 cubic feet of natural gas to produce 1-horse power per hour, as against 18 to 20 cubic feet of illuminating gas, the gas supply must be reduced 25 to 33⅓ per cent. Without the change of adjustment the power developed would be considerably less than it should be, owing to the excess of gas in the mixture.

A mixture of air and natural gas also burns more sluggishly than a mixture containing illuminating gas. This necessitates a different adjustment of the igniter. The proper point of ignition—that is the position of the crank shaft at which the electrodes separate and produce the igniting spark—will be found to be about 4 to 6° earlier than is suitable for illuminating gas.

A Puzzling Case of Burnt Lead Pipe.

That electricity will have a destructive effect on lead pipe under certain conditions is an experience which no longer commands the special attention of plumbers where electricity to return to a power house, for example, may use steam, gas or water piping for the purpose. The appearance of a pipe which has been subjected to such treatment as has been said to resemble a worm eaten branch of wood. Whether or not electricity wrecked the pipe which is shown in the illustration, and was brought to the attention of the *Metal Worker* by

Edward J. Brady, 78 Warren street, New York city, is a matter of uncertainty. This pipe was extra heavy, being 1¼ inch internal diameter and used for water service to a building at 53 Warren street, New York city. It ran from the street through the sub basement of the building, and was surrounded by sand. Its condition was discovered as the result of failure of water to be supplied to the fixtures on some of the upper floors. After the plumber had investigated all the usual causes of leakage and was perplexed as to the cause of the trouble, he was informed that there was a damp spot in the cellar, which led him to dig up the pipe, which was found in the condition shown. At the point where the wiped joint was located it was 10 feet or more from any wall of the building and some distance from any of the other piping. The plumber cut out the piece where the defect was discovered and mended the pipe, and now a solution of the problem as to what caused its destruction is being sought.

As will be seen from the cut there is the appearance of a gradual attack at one point on the pipe, while at the point where the hole ¼-inch in diameter appears, it looks almost as if a very powerful blowpipe had been used. The destruction is all the more mysterious from the fact that water must have spurted through the opening between the two ends of the pipe where the joint is made before the large round hole could have been made in the pipe. Instead of there being evidence of disintegration, with the gradual disappearance of the lead, as would be expected in the ordinary case of electrolysis, the lead surrounding the whole has every appearance of having been melted slightly, as though there had been an arc formed.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Mr. John F. Donahue, of Lynn, Mass., who has been associated with Messrs. J. E. Addicks and T. W. Lawson, for years in their gas operations, has resigned the position of Secretary to the Bay State Gas Company.

"T. J. F.," writing from Washington, D. C., under date of the 14th inst., inclosed the following copies of minutes placed on the books of the Washington Gas Light Company:

"At a meeting of the Board of Directors of the Washington Gas Light Company, held this 10th day of February, 1908, Mr. Goulsborough moved the following resolutions, which were unanimously adopted:

"*Whereas*, The Board of Directors of the Washington Gas Light Company has learned with deep sorrow of the death of George T. Dunlop, who for many years has been one of its most active and honored members, therefore, be it resolved: That it is the sense of the Board that the community, in the death of Mr. Dunlop, has lost a highly respected and trustworthy citizen; one who did thoroughly, conscientiously and courageously, with all his might, whatsoever his hand found to do; who as a master builder in public life and affairs has left an enduring impress upon his day and generation.

"*Resolved*, That the Board realizes that in the death of Mr. Dunlop the Washington Gas Light Company has lost an efficient officer and a staunch and true friend.

"*Resolved*, That in token of its respect for the deceased the Secretary of the Board is hereby instructed to transmit a copy of these resolutions to the bereaved family and cause the same to be published in the daily press of this city."

"The employees of the Chelsea (Mass.) Gas Light Company met some evenings ago in the meeting room of the Company's electric lighting station, and those who were present certainly enjoyed a session that was pleasing and profitable. The lecturer was Mr. Palmer, of the Welsbach Company, whose theme was the treatment of the minerals used in the solution from the time the former were mined until they became fixed in the mantle. Mr. Palmer is surely well versed in such matters, and has the further happy faculty of imparting his knowledge to others in easily understandable fashion. Another interesting and instructive number was an exposition of ways and means for overcoming the effects of gas inhalation, by Doctor Carroll, a well-known medical practitioner of Chelsea. A general collation was served, and a further clever feature was the presence of the ladies of the office force. Much of the credit for this pleasant evening should be given to Assistant Manager Riley.—V. W. M."

Up to the 14th inst. Receiver Pepper redeemed 437 of the outstanding bonds of the Bay State Gas Company, of Delaware, which leaves 70 still to be heard from.

The coke rate per bushel in the yards of the Denver (Col.) Gas and Electric Company have been cut from a high figure of $7.25 per ton to $5, which is pretty good evidence of the effect in Denver of the sad and melancholy days of last October.

The Board of Gas and Electric Light Commissioners of Massachusetts, after quite a hearing and consideration of the testimony offered, has ordered a reduction in the selling rate of the Salem Gas Light Company of 10 cents per 1,000 cubic feet—from $1.20 to $1.10. That seems a pretty low figure.

At the annual meeting of the Detroit City (Mich.) Gas Company, Mr. Irvin Butterworth was advanced to the position of First Vice-President, succeeding the late D. M. Ferry. Mr. Cameron Currie was chosen Second Vice-President, and Mr. J. L. Hudson was named to fill the vacancy on the Board of Directors.

"L. R. M.," forwards the following from Portland, Ore., under date of the 9th inst.: "The Rose Festival Association and the Portland Gas Company are planning the erection of a handsome arch across Sixth street, from the Post Office to the Portland Hotel, for the Rose Festival that will be brought off here next summer. A number of the younger Portland architects are already engaged in drawing for the competition which has been inaugurated for the arch, and Manager Hermann Papst of the Gas Company has agreed to furnish the piping and the gas free of charge. It is proposed to have the arch outlined with gas jets. In a letter received by the Festival Associa

tion, from Councilman W. T. Vaughn, the latter expresses his hearty approval of the proposed welcome arch before the Union Station and agress to do everything in his power to secure the passage of the ordinance calling for the erection of the arch."

A CORRESPONDENT in Waukegan, Ills., forwards the following which, while not revealing anything that may or can be considered new, is worth reading after all. The story is this: "There is only one job which approaches—sometimes it even surpasses—the work of a baseball umpire or a football coach. The unfortunate human being who is always in trouble, always at the receiving end of a kicking public is the gas meter reader. If you don't believe it, ask the North Shore Gas Company's meter reader, who is certainly as patient a party as can be found in Illinois. The man who has read gas meters for a decade comes through the ordeal with the fatalism of an Omar and the cyniciam of an old newspaper man. But his patience is wonderful. Job and his storied fame would appear impetuous and irritable alongside this survivor. The cellar door is his entrance and when this postern gate slams at a certain time of the month a cry goes up from a baby yet unable to pursue its investigations on foot, 'Ma, the gas man has came.' A Japanese war cloud would pale into insignificance before the scurrying of feet which this announcement creates and 1 minute later, 'Ma,' who knows 'gas men' and their ways has the unfortunate cornered in a dark corner of a dark cellar. 'Mrs. Brown, in the house next door, showed me her gas bill yesterday.' Pause. The gas man gathers his reserve force while the curtain goes up and the monologue continues. 'It was 60 cents lower than mine, please explain, will you Mr. 'Gas Man?' 'The most probable explanation Madam is that Mrs. Brown burns 60 cents worth of gas less than you do every month.' 'Now, no sass young man, I know better than that, she consumes twice as much as we do. Say; they sit up to all hours and our lights are always out at 10 o'clock.' 'I will have the meter tested Madam, if you wish., She did wish and it was discovered that the Company was being beaten every day instead of Mrs. Smith and a new register was installed. They had higher bills after that, but Mrs. Smith was satisfied. Nobody can be induced to believe the machine. Often the mistress of the house will lead the meter man triumphantly to the meter and, pointing a finger of scorn, requests him to listen. When one listens intently a faint, a very faint sound is heard. That is where the gas goes to she declares. Either there is a leak or a mouse inside. Protests are in vain for assurances that all meters squak a little falls on deaf ears. A new one has to be installed. The mistress of a large household on the west side still thinks that she has scored a triumph over the meter man; but, alas, it was only a case were ignorance is bliss. 'What about this?' she demanded when the man put in his appearance in answer to her summons. 'Look at this bill. More than our average and here the house has been closed for a month. I've been away with the children for the holidays and George has been home alone. I've caught you at last, my friend.' Matters looked dark but yet the meter man was sure that his reading was correct. Finally the reader determined to go to 'Hubby' and get some light on the subject. That worthy was a bluff, hearty man who enjoyed living and he favored the gas man with a knowing grin. 'I-er had to do a little entertaining for some friends of mine while wifey was gone; are you next? I will pay the extra bill and don't you say anything.'"

PROF. EDWARD O'NEILL, Dean of the Department of Chemistry, University of California, having been called in by the authorities of Berkely, Cal., to test the quality of the gas being supplied there by the Oakland Gas Light and Heat Company, reported that the article was up to every requirement of the standard. In fact, the gas was quite a bit better than that stipulated.

MR. W. W. HESS, of Philadelphia, and associates, who have arranged for the construction of a gas works in Havre de Grace, Md., say that building operations thereon will be commenced within a fortnight.

MESSRS. GEORGE HOWARD, Robert L. Middleton, Woodbury Blair, Montgomery Blair and P. W. Baker have incorporated a company to supply gas in Georgetown, Montgomery County, Mo.

THE Birmingham (Ala.) *Ledger* says that Mr. H. C. Higgins, of Dixon, Ills., who is prominent in the scheme to construct the plant of the Tri-City Gas Company of Gadsden, Ala., will begin work by the first prox.

SOME days ago Alderman Underhill, of the Louisville (Ky.) City Council, at the instigation of the Mayor, offered a resolution requesting the General Assembly of Kentucky to pass an act regulating the appointment of a gas inspector, and also referring to the shareholdings of the city in the Company. The resolution declares that the city be authorized to sell its holdings in the Louisville Gas Company and to remove all restrictions as to the amount of stock any person may hold in the Gas Company, as the present law prohibits any individual from holding over 1,000 shares of stock. It urges that the law provide that the City Council fix the salary of the gas inspector, which is now rated at $3,000 a year. Mr. Uoderhill stated that the city could, under a law passed some time ago, sell its stock in the Louisville Gas Company, and, therefore, this provision was nothing new. It was said that the object is to cut the salary of the gas inspector, and it could not be done as the law now stands. The resolution was unanimously adopted.

ON the 12th inst. gas was turned into the mains of the just completed works of the Bessemer (Ala.) Gas Company, and the trial lighting brought almost every resident of the thriving Alabama city to the offices of the Company, where up-to-date demonstrations of the use of gas for lighting, cooking and heating uses were shown. Manager Harrison is well satisfied with the way in which the Company's efforts to better the condition of Bessemer's business men and Bessemer's housewives as well, were received.—B. R. V."

A CORRESPONDENT in Denver, Col., forwards the following: "The season of rich and rare privileges for the 'bachelor maid' was recently royally ushered in by the giving of a leap-year ball some evenings ago in Cotillion Hall, of the Denver Gas and Electric Company. Over 250 employees of the Company and their friends shared the festivities. A feature of the beautiful decorations was the illumination of two large American flags arranged in the shape of stars in the center of the hall. The lights were given a star effect, which was shown to best advantage during the moonlight dance towards the close of the programme. Elmer Jackson and A. W. Hahn, two of the representatives of the Company, did the work in connection with this artistic effect: this decorative lighting will be made permanent in the hall. The two flower girls. Miss Clara Risley and Miss Carroll Stannard, lavished carnations on every gentleman in attendance. The grand march was led by the secretary of the Company, Mr. C. N. Stannard and wife, the Treasurer, Mr. John T. Brady and wife, and Miss Ida Conklin and Mr. R. F. Bump. The affair was given under the active direction of Miss Conklin, assisted by the following committee: Mrs. W. J. Barker, Chairman; Mrs. C. N. Stannard, Mrs. J. T. Brady, and the Misses Evits, McKee, Hickman, Bailee, Ridley and Anderson.

"L. F. G.," writing from New Westminster, B. C., forwards this mention: "Last week the feature of the committee meeting of the City Council was the appearance before the Council of Mr. James Cunningham, principal owner of the New Westminster Gas Company, and Manager Brown, to protest against the granting of a franchise to another Gas Company. Mr. Cunningham stated that the agreement he held with the city did not give him an exclusive franchise, but he believed in an unwritten law that would give his Company protection. He stated that he would be able to supply gas cheaper, but that he had agreed to maintain present prices so as not to compete with the city's electric light system. The rate here was $2.50, while in every other city the rate was $1.50 or less. Mr. Cunningham also offered to sell his plant to the city, but no action was taken in the matter, and he left without receiving any satisfaction as to the course the authorities would probably pursue. Mr. Cunningham's position is certainly an odd one."

THE Haverhill (Mass.) *Gazette* reports that the case of the Haverhill Gas Company, that has been pending in the courts for some time past, will now be pushed for a decision. This announcement has been made by General Manager P. J. Nevins, of the Company, who said that this policy has been agreed upon by the Directors of the Company, and that ex-Mayor Matthews, of Boston, who is counsel for the Company, will take the necessary steps at once, as the Directors wish to secure a decision as quickly as possible. The case has been pending in the courts since 1899, when the Company appealed from the decision of the State Gas and Electric Commission ordering an 80-cent rate for gas in the city. An effort was made by the Attorney-General, who represents the State Board, to have the case taken from the United States District Court to a lower court, but this was opposed by the Company on a demurrer and the demurrer was sustained. The case will not be taken up in the United States District Court on the appeal from the decision of the State Commission, as Manager Nevins says that the Company wishes to have the controversy ended before any work on the extension of the gas mains is mapped out for the coming summer."

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Company, 39 and 41 Chambers street.

Germany—Lemcke & Buechner, of New York.

England—Aug. Siegle, 30 Lime street, London.

MONDAY, FEBRUARY 24, 1908.

The Market for Gas Securities.

Gas securities show very little change in prices, and the market is extraordinarily dull, there being no disposition to trade.

There have been redeemed to date about $459,000 of the $507,000 Bay State Gas Company income bonds.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

FEBRUARY 24.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$78,177,000	100	99	99¼
Central Union Gas Co.—				
1st 5's, due 1912, J. & J.	3,000,000	1,000	92	97
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual	8,500,000	100	—	170
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	85	90
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98	104
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	90	98
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	100	105
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Standard	5,000,000	100	70	100
Preferred	5,000,000	100	100	125
1st Mtg. 5's, due 1990, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	90	100
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91½	92
Yonkers	200,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	¾	⅞
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
" " Bonds, 5's	5,250,000	1,000	63	66
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,600,000	1,000	104	105¼
Cincinnati Gas and Electric Co.	20,500,000	100	93	93¼
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	92	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	87	88
Preferred	3,026,500	100	81	82
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	90
Mortgages, 6's	3,600,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Detroit City Gas Co.	6,000,000	50	—	50
" Prior Lien 5's	4,618,000	1,000	—	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Lt. Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	100	105
" Bonds, 5's	10,500,000	—	101	102½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	10	82	—
" 1st Mtg. 5's	200,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	97	97½
Preferred	2,500,000	100	92½	93
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	106	108½
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	53	—
Preferred	25,000,000	100	82	—
Montreal, Canada	2,000,000	100	215	21-½
Nashville Gas Lt. Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	84½	84¾
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Elec. Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco, Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	92	—
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	96¼	—
Syracuse, N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	102	—
Washington, D. C.	2,600,000	20	300	305
1st Mortgage, 6's	600,000	—	—	—
Western, Milwaukee	4,000,000	—	—	—
Wilmington, Del.	600,000	50	220	—

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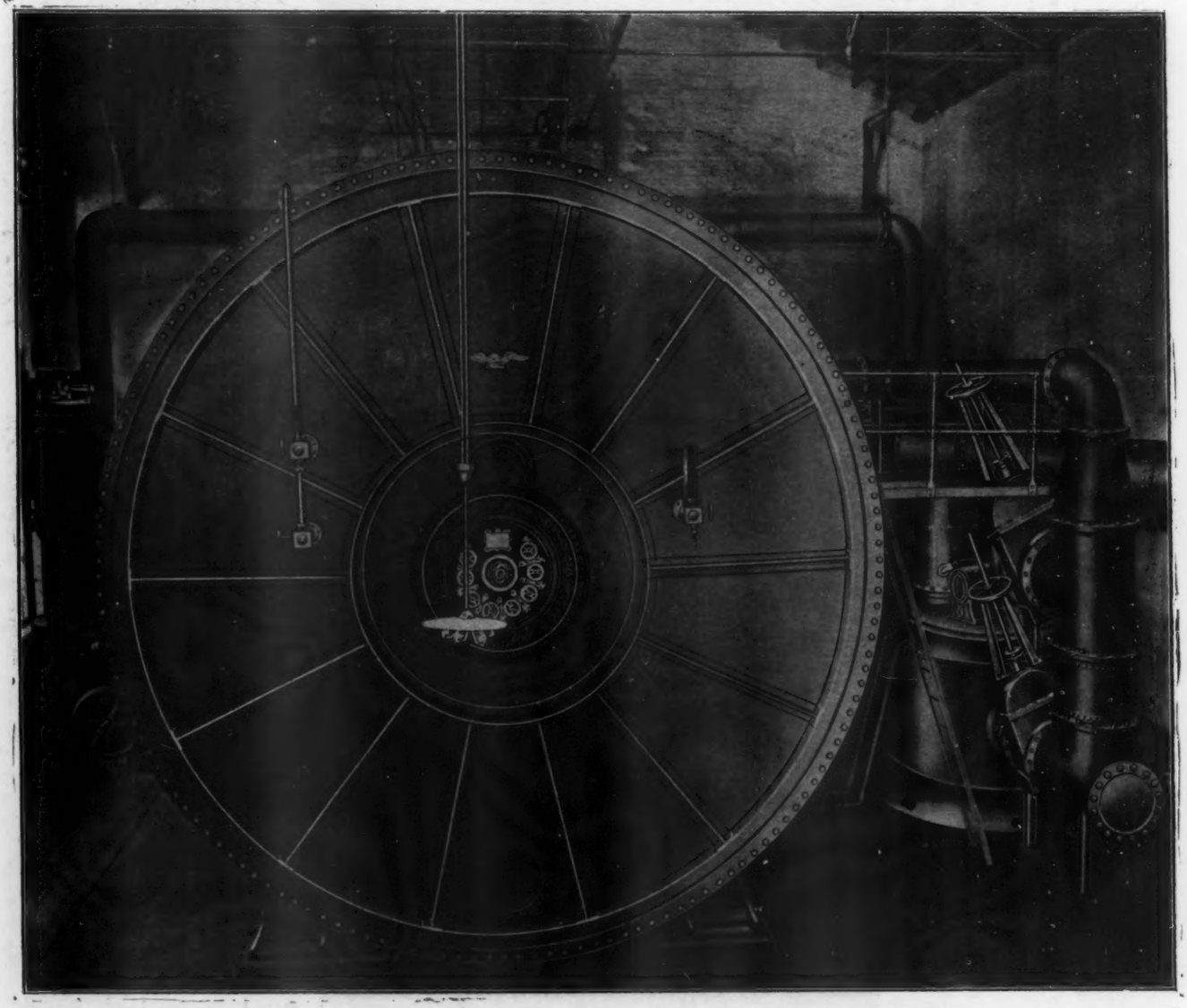

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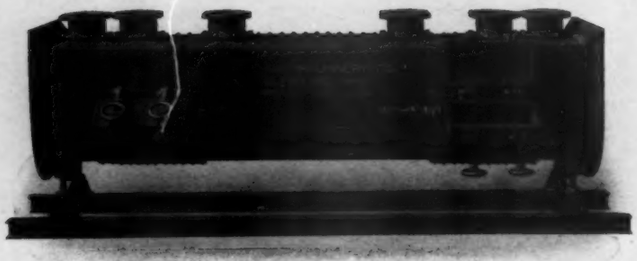


HYDRAULIC MAIN WITH STANDS AND I-BEAM SUPPORTS.

THE GAS MACHINERY CO.
CLEVELAND, OHIO.

ANNOUNCEMENT.

January 1st, 1908.

TO OUR PATRONS AND FRIENDS:

Our new Firebrick Factory has been completed and we are now ready to take orders for high grade fireclay products of any description and magnitude. We design and build

Coal Gas Benches,

VERTICAL, INCLINED OR HORIZONTAL RETORTS,

LATEST PATENTED SYSTEMS.

Coke Ovens,

BEEHIVE AND BY-PRODUCT CONSTRUCTION.

Manufacture Linings for Water Gas Apparatus, Rotary Cement Kilns, Blast Furnaces and Stoves, Steel Furnaces, Lime Kilns, Cupolas, etc., etc.

SPECIAL GLASS HOUSE REFRACTORIES.

WE IMPORT THE FINEST FIRECLAY FOR SPECIAL HIGH GRADE WORK.

Our Chemist Engineers are familiar with analyzing clays and producing mixtures so that the finished products will answer specific purposes with regard to refractory as well as physical properties.

ALL MATERIAL OF THE VERY BEST QUALITY AND WILL BE SOLD AT THE LOWEST PRICES PERMISSIBLE.

Your Correspondence is Respectfully Solicited.

DIDIER-MARCH COMPANY.

FREDERICK J. MAYER, General Manager.

Factories: Keasbey, N. J. *Offices: Keyser Bldg., Baltimore, Md.* *Park Row Bldg., New York.*

FREDERICK J. MAYER, M.E.,

Main Office: Keyser Bldg., Baltimore, Md. *Branch Office: Park Row Bldg., New York.*

Bench construction of most modern type, with horizontal, inclined and vertical retorts, together with retort houses, coal and coke handling machinery, specially designed to suit the characteristic requirements of the benches.

CONSULTING AND CONSTRUCTING ENGINEER.

Plans for modern and up-to-date coal and water gas plants. Modernizing existing plants to cheapen costs of production. Valuation of plants, etc., etc.

Sole representative of the Dessau Vertical Retort Bench Co.,

Berlin, Germany.

"CHRISTY PLANT," FORMERLY CHRISTY FIRECLAY CO.

"LACLEDE-CHRISTY" GAS ENGINEERS.

"LACLEDE PLANT." FORMERLY LACLEDE FIREBRICK MFG. CO.

OUR ENGINEERING DEPARTMENT IS EQUIPPED TO DESIGN, CONTRACT FOR AND BUILD COMPLETE GAS PLANTS FROM BREAKING OF GROUND TO MAKING GAS.

IF YOU WANT { DESIGN, MATERIAL, WORKMANSHIP, BENCHES, RESULTS, } THE BEST

COMMUNICATE WITH

LACLEDE-CHRISTY CLAY PRODUCTS CO.,

ST. LOUIS, MO.

"EVERYTHING THAT IS MADE FROM CLAY."

Ramsdell

THE BIJOU
For the Home.

The Bijou is the ideal lamp for home illumination. Best on account of its small size. Best fitted to add attractiveness to home surroundings. Best adapted to home illuminating requirements, giving 20 candles of soft, mellow light, "downward, where needed." Readily applied to existing fixtures.

The popularity of the Bijou is rapidly increasing and is unquestionably the ideal light for the home. Every dealer should put it before his customers.

List price: No. 3, with porcelain cone, $1.40. No. 6, with porcelain cone and double mixing chamber, $1.50. All Bijou Lamps boxed complete, with globe, mantle and adaptor.

The Bijou for the Home.

RAMSDELL INVERTED GAS LAMP COMPANY,

Geo. G. Ramsdell, President,

1123 Broadway, New York.

BEST IN THE WORLD.

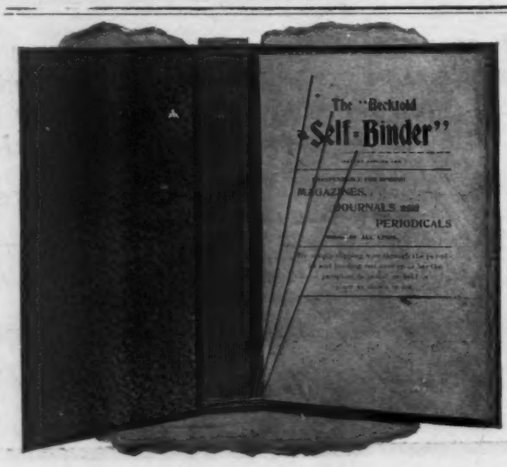
THAT MEANS THE

Humphrey Instantaneous Bath Water Heaters.

They should be used in every home, no matter whether there are other hot water arrangements or not. ∴ ∴ ∴ ∴ ∴ ∴ ∴ ∴

Handsome New Catalog No. 9 is Free. Shall we Send it? ∴ ∴

HUMPHREY CO.,
Kalamazoo, Mich., U. S. A.



Binder
FOR THE
Journal.
PRICE,
$1.

For Sale by

A. M. CALLENDER & CO.,

42 Pine Street, New York City.

YORK GAS RANGES FOR 1908

Have the Safety Open Door Lighter for oven burners. This safety lighting device absolutely does away with all liability of ovens exploding.

York and New-York Gas Ranges for this Season

HAVE ALL THE GOOD POINTS OF THE UP-TO-DATE RANGES.

CATALOG WILL BE READY FEBRUARY 1ST.

If you have been dissatisfied with your Stove Tubing, try the Atlantic Tubing Company's Special Stove or Safety Stove Tubing. We sell it in any quantity.

Let us send you samples of Gas Brackets.
Let us quote you on contract Gas Fixtures.
Let us quote you on Special Appliances.
Let us quote you on Flexible Metal Tubing.
Let us quote you on Automatic Soldering Furnaces.
Let us quote you on Hot Plates.
Let us quote you on Art Glass Domes and Shades.

FRED. K. WELLS COMPANY,

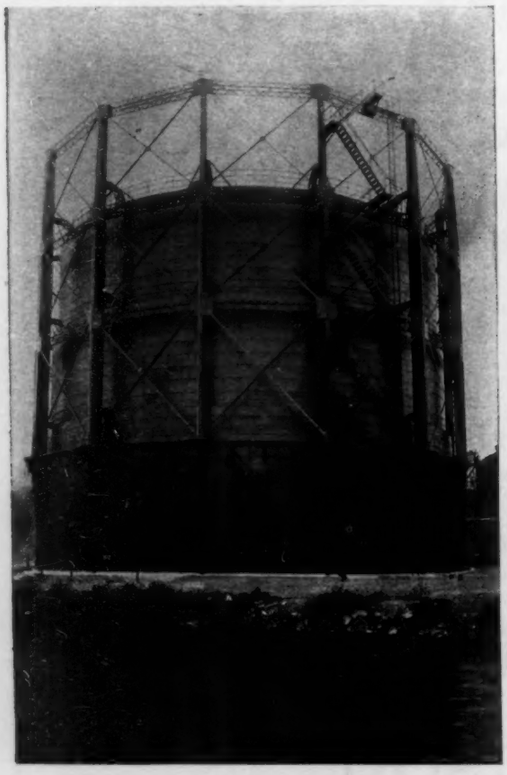
18 Warren Street, New York City,

Selling Agents of Gas Appliances, Etc., Etc.

ARTHUR R. CRUSE, President.
HENRY W. SCATTERGOOD, Vice-President and Treasurer.
FRANK FLAVELL, Secretary.

Western Sales Engineer:
HENRY I LEA,
616 The Rookery, Chicago, Ills.

Pacific Coast Agents:
HALLIDIE MACHINERY CO.,
Seattle, Wash.



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PHILADELPHIA OFFICES:
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WORKS:
AMBLER, PA.

Manufacturers of

TRIPLE
DOUBLE and
SINGLE-LIFT

Gas Holders,

WITH OR WITHOUT
METAL TANKS.

Oil and Water Tanks,
Purifier Covers,
General Plate Metal Work, and
Steel Water Towers.

PLANS, SPECIFICATIONS AND ESTIMATES
PROMPTLY FURNISHED ON REQUEST.

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A. F. WEHNER, SECRETARY
R. K. WEHNER, TREASURER

ISBELL-PORTER COMPANY

GAS ENGINEERS & BUILDERS OF GAS WORKS

BENCH WORK

CHARGING AND DISCHARGING MACHINERY

MACKENZIE EXHAUSTERS

PRIMARY AND SECONDARY CONDENSERS FOR FRESH OR SALT WATER

ISBELL VALVES SPECIALS

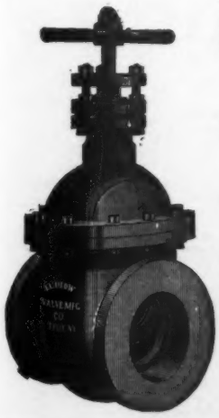
TAR EXTRACTORS

P&A. TAR EXTRACTORS FOR WATER GAS

ROTARY AMMONIA SCRUBBERS

SHAVING SCRUBBERS
PURIFIERS
STREET GOVERNORS

MAIN OFFICE AND WORKS
BRIDGE & OGDEN STREETS
NEWARK, N.J.
ESTABLISHED 1865



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Ludlow Valve Mfg. Co.,

TROY, N. Y., U. S. A.

Double and Single Gate Valves, ¼" to 72",

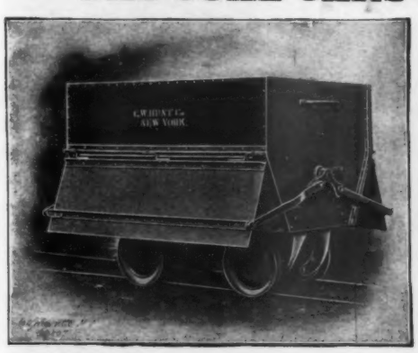
—FOR—

Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.

GAS COKE CARS for handling Coke in Gas Houses.



GAS COKE CAR WITH WATER SPRAY ATTACHMENT TO PREVENT CAR FROM BECOMING RED HOT.
THE ILLUSTRATIONS SHOW THE DOORS OF THE CAR BOTH OPEN AND CLOSED.

We have designed and built a large variety of cars for handling coke, and illustrations, showing some of the different types, are given in Bulletin A.I. A copy will be mailed to any Gas Engineer mentioning this paper.

West New Brighton, N. Y. **C. W. HUNT CO.** 45 Broadway, New York City.

ARTHUR E. BOARDMAN, C.E.,

For several years associated with the late
CAPTAIN WILLIAM HENRY WHITE,
WILL CONTINUE THE BUSINESS OF

CONSULTING ENGINEER

For Gas, Water and Electric Light Companies, at
No. 41 Wall Street, Room 1707, New York.
TELEPHONE, 5534 BROAD.

ESTABLISHED 1856.

HENRY MAURER & SON,

Manufacturers of

High Grade Firebrick, Blocks, Tiles,

ETC.,

Works: Maurer, N. J. Office: 420 E. 23d St., N. Y. City.

BRISTOL'S

REG. U.S. PAT. OFFICE.

RECORDING GAUGES,

THE STANDARD FOR GAS WORK ON HIGH OR LOW PRESSURE.

For Works and Distribution System.

We offer the following types in all ranges:

Standard Form.
Portable Form,
Moisture Proof.

ASK FOR CATALOGUE A.

THE BRISTOL COMPANY,

Waterbury, Conn., U. S. A

NEW YORK: 114 Liberty St.
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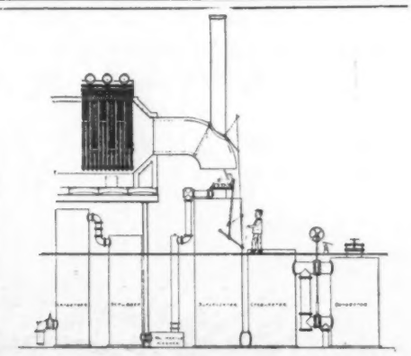


WOULD YOU LIKE TO SAVE 10 PER CENT. OF GENERATOR COAL AND 20 PER CENT OF BOILER COAL?

Some time ago we sent you a booklet explaining how, by the use of the Green Air Heater and the Green Economizer, we have made the above savings in the manufacture of water gas. We figured the matter out and corroborated our figures by tests.

Our apparatus has been running now long enough so that you can verify from the gas company's books the fact that the outfit works even better in practice than we claimed. Not only does it save coal, but it also saves oil, probably because the carburetter and superheater are more thoroughly heated. More than that, it increases the capacity of the plant by reducing the period of blast in about the same proportion that the consumption of generator coal is reduced. A man can run more blasts per day with the machine, thereby cutting down interest and operating charges. Our apparatus pays handsomely where only a single gas machine is operated, but it may be so arranged that three machines can exhaust their stack-valve gases through one Green Air Heater and Economizer, trebling the earnings on the investment.

If you operate a gas plant you must be interested in a saving of this magnitude. If you are skeptical as to our statements, let us give you full facilities for investigating every detail. Collect your own facts and draw your own conclusions. Write for Bulletin 110 AG.

The Green Fuel Economizer Co.,

MATTEAWAN, N. Y.

New York City, Boston, Chicago, Atlanta, San Francisco, Los Angeles, Seattle, Salt Lake City, Montreal.

Engineers, Builders of Green's Fuel Economizers, Fans, Blowers and Exhausters, Steam Air Heater Coils, Waste Heat Air Heaters, Mechanical Draft, Heating and Ventilating and Drying Apparatus, Draft Dampers and Engines.

12-Inch High Pressure Governor

REYNOLDS' GAS REGULATOR COMPANY,

ANDERSON, IND., U. S. A.

We make all sizes for all classes of reduction,

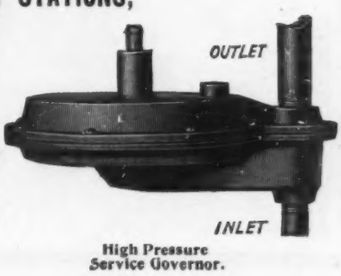
DOUBLE and SINGLE DISTRICT STATIONS,

And Individual Service Governors for Reducing High Pressure.

HOLDER GOVERNORS

And Low Pressure Regulators, all of the Dry Diaphragm type.

Write for Catalog.



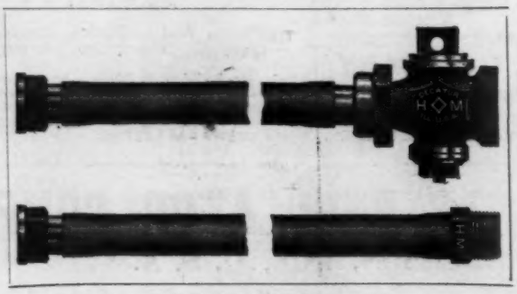
High Pressure Service Governor.

LLOYD CONSTRUCTION COMPANY
THE LLOYD INTENSIVE SCRUBBER.
DETROIT—MICHIGAN

"The Stationary Rotary."

A Simple Engine
and
A Rotary Pump
do
All the Work.

Mueller
Sweat Joint Gas Meter Connections.



(Patented.)

The man who makes an occasional meter connection is at a disadvantage in not having the equipment of the man whose business it is to make them and nothing else.

Mueller Workmen on Mueller Sweat Joint Meter Connections have automatic machines to shape pipe ends to the required depth and diameter of the Mueller red brass fittings that are used. There is regularity in length, strength and workmanship.

All connections are tested before leaving the factory. Unconditionally Guaranteed. Prices quoted on inquiry and immediate shipment on order.

MUELLER

H. MUELLER MFG. CO.,

Works and General Offices,
DECATUR, ILL., U. S. A.
West Cerro Gordo St.

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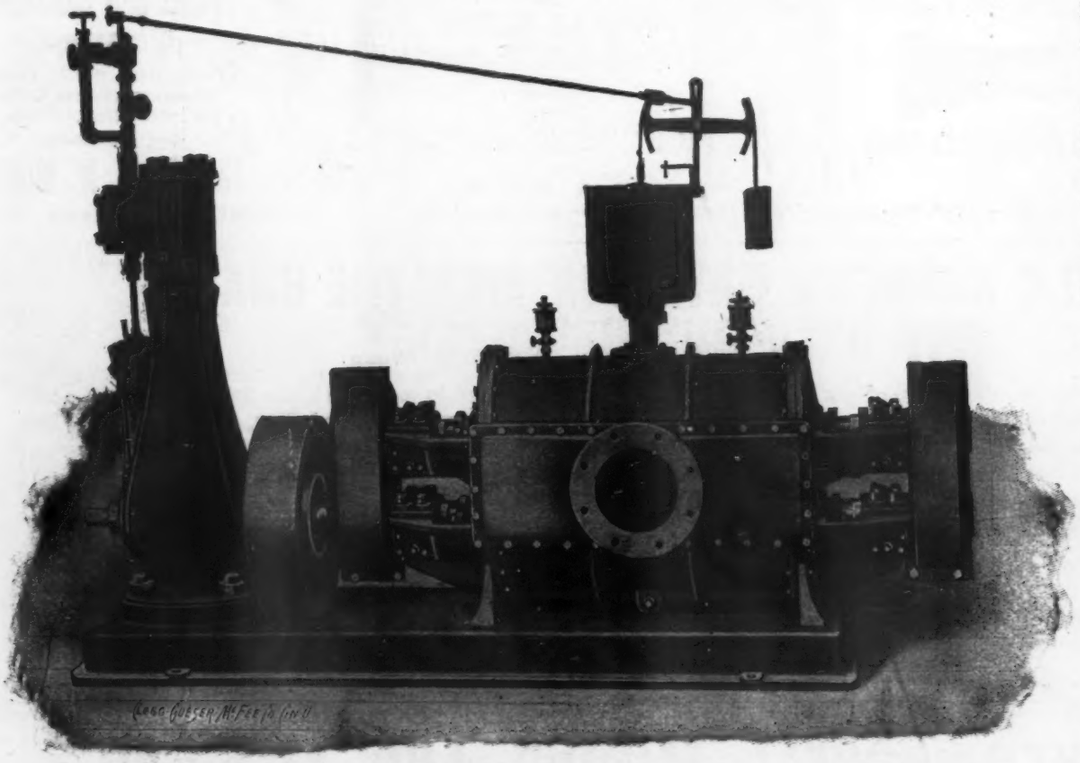
NEW YORK, N. Y., U. S. A.
254-258 Canal St. (cor. Lafayette).

ROOTS' GAS EXHAUSTERS.



Sizes for any required capacity.

Self-oiling, adjustable bronze bearings.

Most perfect and sensitive Governor.

Write for Catalogue.

P. H. & F. M. ROOTS COMPANY,

HOME OFFICE:
Connersville, Ind.

NEW YORK OFFICE:
120-122 Liberty St.

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1547 Marquette Bldg.

Send for pocket edition of Engineers' practical reference book.

-in every store where there's something doing
You find
HUMPHREY GAS ARC LAMPS
Because every fabric, every color scheme, every article gets it's true color value
THE MERCHANT ALSO IS GETTING THE CHEAPEST STORE ILLUMINATION TO BE HAD AND THE BEST AS WELL

GEORGE ORMROD, Pres. & Treas. JOHN D. ORMROD, Supt.
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EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA.

MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

WILLIAM H. BRISTOL,

COMBINATION RECORDING and INDICATING PYROMETERS

for

WATER GAS MACHINES.

Indicator for Operator. Recorder for Superintendent. Adapted for both Carbureter and Superheater.

Send for Circular and List of Users.

WM. H. BRISTOL,

45 Vesey Street, - - New York City.

"THE MINER"

Globe Street and Boulevard Lamps.

Cheapest and Best

THOUSANDS IN USE WITH INCANDESCENT BURNERS.

Send for Catalogues.

THOMAS T. W. MINER,

821-823 Eagle Av., N.Y.

Bray's Union-Jet.

OTHER BURNERS MAY LOOK LIKE THE BRAY, BUT ONLY ON THE OUTSIDE.

If you could see the **inside** of the **BRAY**, if you could have pointed out to you those **little details of manufacture**, those things which have an **all-important bearing** on the **durability**, if you could compare the **BRAY BURNER part** for **part** and **material** for **material** with any other burner on the market, then you could better understand why

BRAY BURNERS ARE BEST AND WILL OUTLAST ANY BURNER EVER MADE.

Our "Blue Book" would prove interesting to you. May we send it?

W. M. CRANE COMPANY,

1131-1133 Broadway, New York, N. Y.,

WE MAKE GAS APPLIANCES OF ALL KINDS. SOLE AGENTS FOR BRAY BURNERS FOR U. S. AND CANADA.

Self-Lighting Burner.

PARKER-RUSSELL MINING AND MFG. CO.,

ST. LOUIS, MO.

ST. LOUIS OFFICE: Suite 501-508 Liggett Building, 8th and Chestnut Streets.
NEW YORK OFFICE: 45 Broadway.

GAS RETORT BENCHES, STOKING MACHINERY, STAND-PIPE CLEANER AND STRAIGHT STAND-PIPE SYSTEM.

GAS RETORTS AND FIREBRICK.

We Manufacture Gas Retorts and Settings, Furnace Blocks and Fire Clay Tiles of Every Description.

Benches.--We erect GAS RETORT BENCHES with Horizontal retorts having closed ends up to 10 feet in length, or Through retorts up to 20 feet in length.

Slopers.--Also, SLOPERS on improved lines for Inclined Retorts.

Stoking Machinery.--Sole Agents for U. S. and Canada for the Fiddes-Aldridge Simultaneous Discharging Charger. The "F. A.," or "One-Stroke" Machine. Cost of Carbonizing reduced to minimum. No Dust. Silent. No Waste of Coal. No Injury to Retorts.

Water Gas Linings.--We make a specialty of WATER GAS BLOCKS, and supply brick of superior grade for checkerwork.

Stand-Pipe Cleaner and Straight Stand-Pipe System.--Agents for the sale of the Stand-Pipe Cleaner and Straight Stand-Pipe System of the United Gas Improvement Company.

Retort Houses and Conveying Machinery.--We also build Retort Houses, Coal and Coke Conveying Machinery. Plans, specifications and estimates cheerfully furnished.

CORRESPONDENCE SOLICITED.

ALL CONTRACTS MADE, AS OF ST. LOUIS.

Directory of American Gas Companies, 1907. **Price, $5.00.** For Sale by A. M. Callender & Co., 42 Pine St. N.Y.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

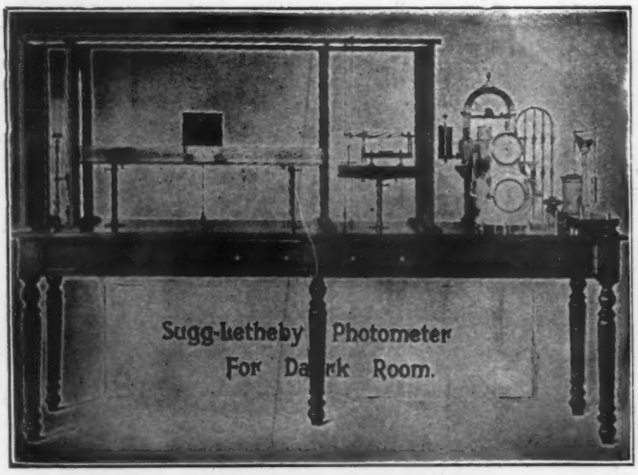
MARCH, 1908.

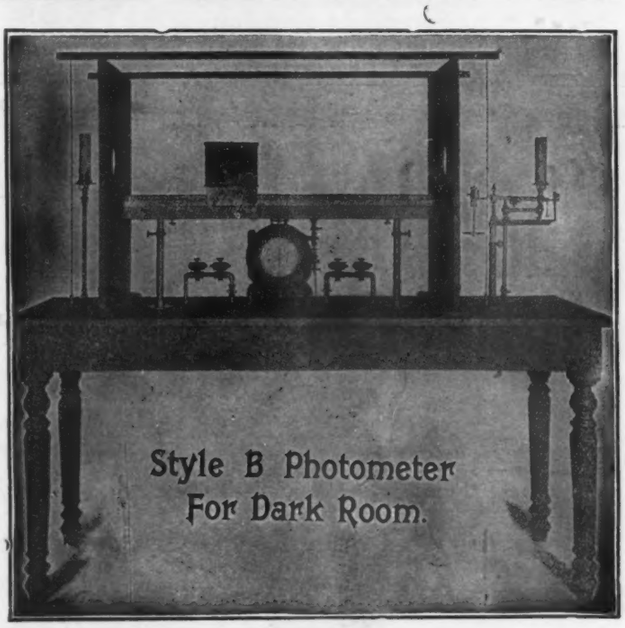
Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.
Sun.	1	6.20 PM	5.30 AM
Mon.	2	6.20 NM	5.30
Tue.	3	6.20	5.30
Wed.	4	6.20	5.30
Thu.	5	6.20	5.30
Fri.	6	6.20	5.30
Sat.	7	10.40	5.30
Sun.	8	11.40	5.20
Mon.	9	12.40 AM FQ	5.20
Tue.	10	1.30	5.20
Wed.	11	2.20	5.20
Thu.	12	3.10	5.20
Fri.	13	3.40	5.20
Sat.	14	4.20	5.20
Sun.	15	4.50	5.10
Mon.	16	No L.	No L.
Tue.	17	No L. PM	No L.
Wed.	18	No L.	No L.
Thu.	19	6.40 PM	8.50 PM
Fri.	20	6.40	9.50
Sat.	21	6.40	11.00
Sun.	22	6.50	12.00
Mon.	23	6.50	1.10 AM
Tue.	24	6.50	2.10
Wed.	25	6.50 LQ	3.20
Thu.	26	6.50	4.10
Fri.	27	6.50	4.50
Sat.	28	6.50	4.50
Sun.	29	6.50	4.40
Mon.	30	6.50	4.40
Tue.	31	6.50 NM	4.40

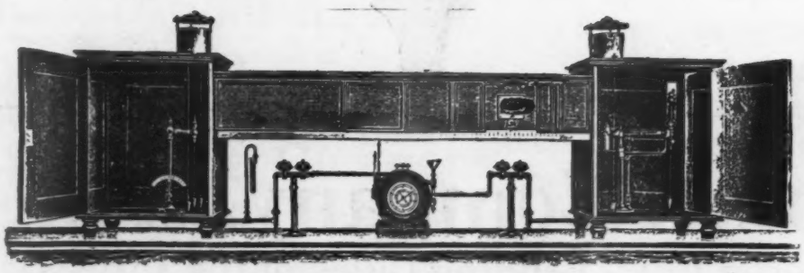
TOTAL HOURS DURING 1908.

By Table No. 1.

	Hrs. Min.
January	228.30
February	187.30
March	192.00
April	160.10
May	155.10
June	138.00
July	155.50
August	173.40
September	185.20
October	214.00
November	218.10
December	226.40
Total, yr.	2235.00







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

MARCH, 1908.

Day of Week.	Date.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Complete Lighting in One Hour From Time Given P. M.	Complete Extinguishing in 50 Minutes From Time Given A. M.
Sun.	1	5.22	5.32
Mon.	2	5.22	5.27
Tue.	3	5.22	5.27
Wed.	4	5.22	5.27
Thu.	5	5.32	5.17
Fri.	6	5.32	5.17
Sat.	7	5.32	5.17
Sun.	8	5.32	5.17
Mon.	9	5.32	5.17
Tue.	10	5.32	5.17
Wed.	11	5.32	5.17
Thu.	12	5.42	5.07
Fri.	13	5.42	5.07
Sat.	14	5.42	5.07
Sun.	15	5.42	5.07
Mon.	16	5.42	5.07
Tue.	17	5.42	5.07
Wed.	18	5.42	5.07
Thu.	19	5.52	4.57
Fri.	20	5.52	4.57
Sat.	21	5.52	4.57
Sun.	22	5.52	4.57
Mon.	23	5.52	4.57
Tue.	24	5.52	4.57
Wed.	25	5.52	4.57
Thu.	26	5.57	4.47
Fri.	27	5.57	4.47
Sat.	28	5.57	4.47
Sun.	29	5.57	4.47
Mon.	30	5.57	4.47
Tue.	31	5.57	4.47

TOTAL HOURS DURING 1908.

	Hrs. Min.
January	481.50
February	329.15
March	351.50
April	341.50
May	233.05
June	218.10
July	282.55
August	254.55
September	292.25
October	420.45
November	374.30
December	411.05
	3992.35
Deduct on account of 50 min. extinguish'ng time	30.30
Total, yr.	3962.05

NEW YORK, 318 West 42d Street. BOSTON, 820 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, 218 La Salle Street. SAN FRANCISCO, 512 Oak Street.

WELSBACH STREET LIGHTING COMPANY

....OF AMERICA....

No. 36.

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 180 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

The Chic Light.

ONE OF THE MOST POPULAR AND BEST SELLERS OF THE WELSBACH LINE.

For decorative appearance and large volume of light at a popular price to the consumer,

THE CHIC LIGHT

is practically alone in the field. Complete satisfaction to the user is its strong point.

THE CHIC LIGHT—Design No. 71310.

PRICES:

Boxed complete, with No. 71 Welsbach burner, No 310 F. Q. M. cylinder, No. 196 Junior J Brand Welsbach mantle, including the No. 316 opal shade, which will be packed separately.

Price, complete, clear cylinder, each, dozen lots, ... $1.35
Price, complete, clear cylinder, 100 lots, each, ... 1.25

When supplied with **No. 310 F. Q. M. Opal Cylinder** add 10 cents to above list.

Price of Shade No. 316.
Package Contains 16 Dozen.

Price, per dozen, ... $4.40
Price, original package, per dozen, . 4.00

WRITE FOR DISCOUNTS.

Welsbach Company, FACTORIES: Gloucester, N. J. Chicago, Ills.

Salesrooms in all Leading Cities of the United States.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

LESSEES, OPERATORS AND BUILDERS OF **GAS WORKS.**

Largest Builders of CARBURETTED WATER GAS PLANT IN THE WORLD.

SOLE AMERICAN BUILDERS

OF THE

Standard Double-Superheater Lowe Water Gas Apparatus.

1907 CONTRACTS.

PARTIAL LIST OF PLACES:

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Helena, Mont.
Bridgeport, Conn. (3d contract).
Suffolk, Va.
Winsted, Conn. (2d contract).
Nashua, N. H.
Augusta, Me. (2d contract).
Everett, Mass.
Jenkintown, Pa. (2d contract).
Coney Island, N. Y.
Mexico, Mo.
Jacksonville, Fla.
Syracuse, N. Y. (2d contract).
Atlanta, Ga. (2d contract).
Holyoke, Mass.
Peoria, Ills.
Schnectady, N. Y. (2d contract).
Danbury, Conn.
Galveston, Tex. (2d contract).
Quebec, Canada.
Indianapolis, Ind. (2d contract).
Bessemer, Ala.
Waterbury, Conn. (5th contract).
Sioux Falls, S. D. (3d contract).
Philadelphia, Pa.
New Hartford, Conn.
Poughkeepsie, N.Y. (2d contract).
Nashville, Tenn.
Salisbury, Md.
Norfold, Va. (4th contract).
Wallingford, Conn.
Richmond, Va. (2d contract).
Oak Bluffs, Mass.

TOTAL SETS INSTALLED DURING YEAR, ... 43
TOTAL SETS INSTALLED TO DECEMBER 31, 1907, ... 677
TOTAL DAILY CAPACITY, TO DECEMBER 31, 1907, ... 545,865,000 cu. ft.

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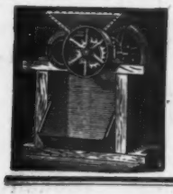

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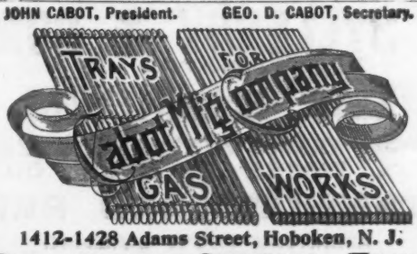

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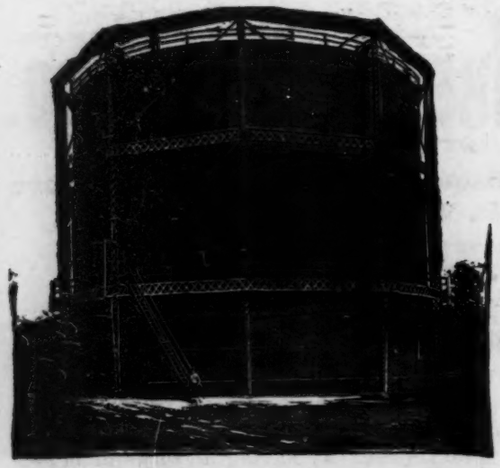

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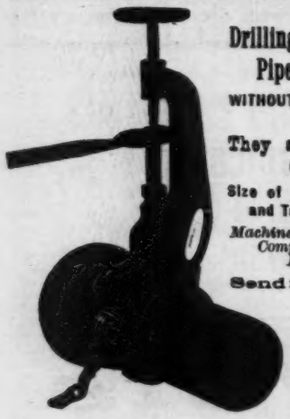

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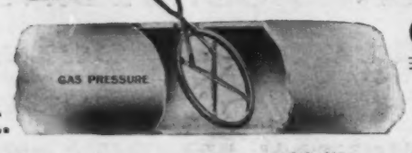

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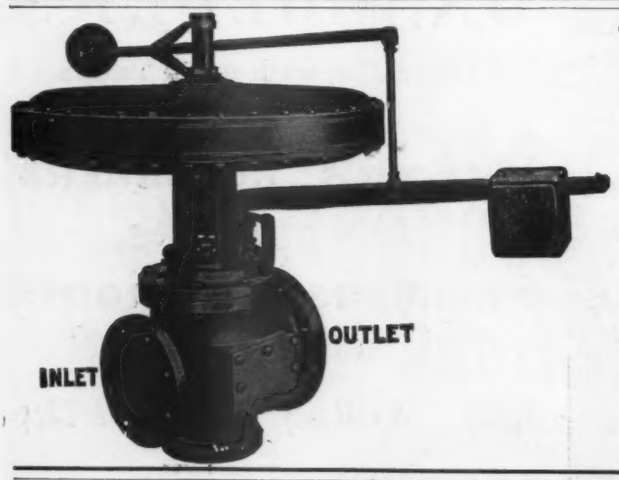

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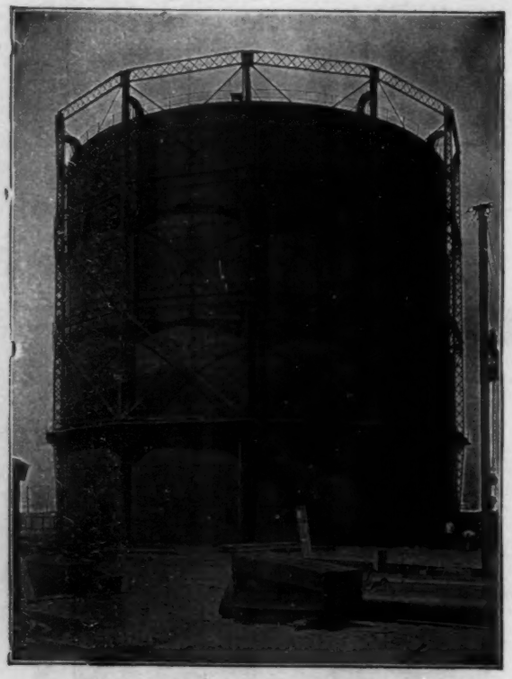

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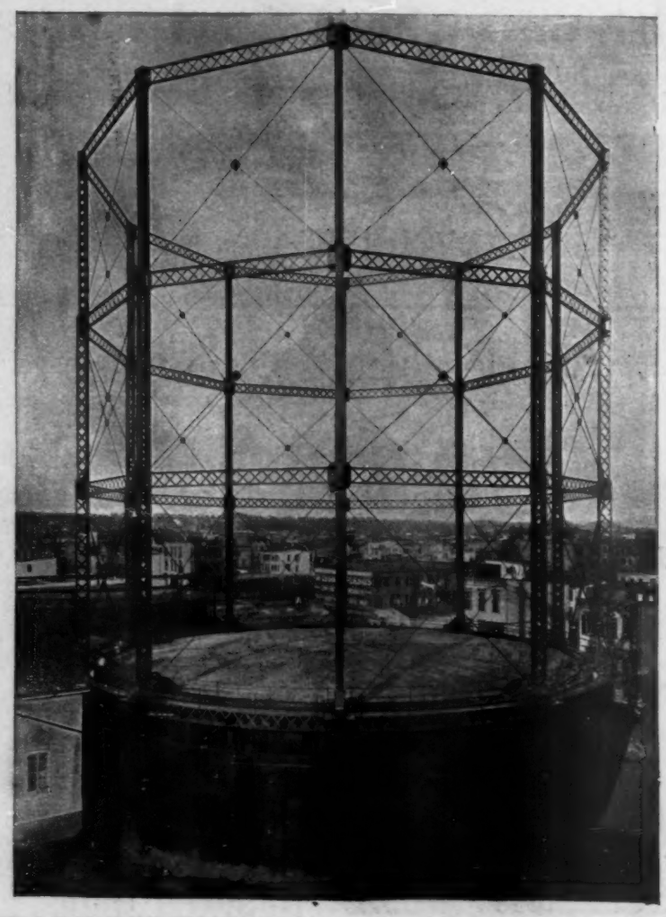

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